THE

VETERINARY JOURNAL

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Veterinary Adviser to various Overseas Governments; late Chief Veterinary Officer to the Corporation of the City of London

AUGUST-SEPTEMBER, 1938

Biography

MR. GEOFFREY LIVESEY

President of the Royal College of Veterinary Surgeons

FEW members of Council have shown more practical interest in the affairs of the profession than our present President, for during his sixteen years of service he has only missed one attendance, his record of being present 729 times out of 730 being unique evidence of the conscientious assiduity and seriousness with which Mr. Livesey undertakes any duty of which he accepts the responsibility.

Commencing his professional career in 1895 as a pupil at the New College, he completed the final from the " Dick," graduating in 1899; and after practising for some time in Worcestershire ultimately settled down at Hove in Sussex, where he built up a lucrative and influential canine *clientèle,* being one of the first veterinary surgeons to use a car. His practice extended over a very large area, but in the intervals of a busy life he found time to devote to

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other political and professional matters, being elected President of the Southern Counties Association in 1913 and of the Central Society in 1922.

The National Veterinary Association owes him much, for it was Livesey who stepped into the gap and took over the duties of Secretary at a very brief notice on the much lamented death of Mr. James Malcolm, of Birmingham. The "National" was then in its building-up stage, and no man worked harder or more earnestly for this "growing child" of the profession than did its Secretary. His hand, too, was often in his pocket and it is not generally known by the present generation that the President's gown was Mr. Livesey's gift.

That he will work as hard for the welfare of the "Royal College" as he did for the "National" goes without saying, and one may rest assured that at the end of his Presidential year he will be able to look back with pride and satisfaction on work well and truly done.

It is needless to say that Mr. Livesey carries with him the good wishes and support not only of the Council but of every member of the profession.

PROFESSOR LECLAINCHE

President of the International Veterinary Congress

THE position of President of the International Veterinary Congress is the highest honour which any veterinarian can receive at the hands of his professional brethren, and every Veterinary Society in Europe and America will congratulate Professor Leclainche on having attained this pinnacle of professional success in the esteem of his fellow men.

Our distinguished colleague needs no introduction to his British and Continental *confrères,* for his name has been world-wide known for many years.

The public position he occupies in the world of veterinary science in France has given him a full scope for original work which would not have been possible in private practice, and the work which he has done will go down to posterity.

His present position is that of "Directeur de l'Office International des Epizootiques," a very influential post, and as President of the International Veterinary Congress Dr. Leclainche will have much to occupy his attention during the coming year.

The 13th International Veterinary Congress is fortunate in having so distinguished and popular a President, and the unanimous wish of its members is that he may be spared for many years to enjoy the fruits of his well-earned labours.

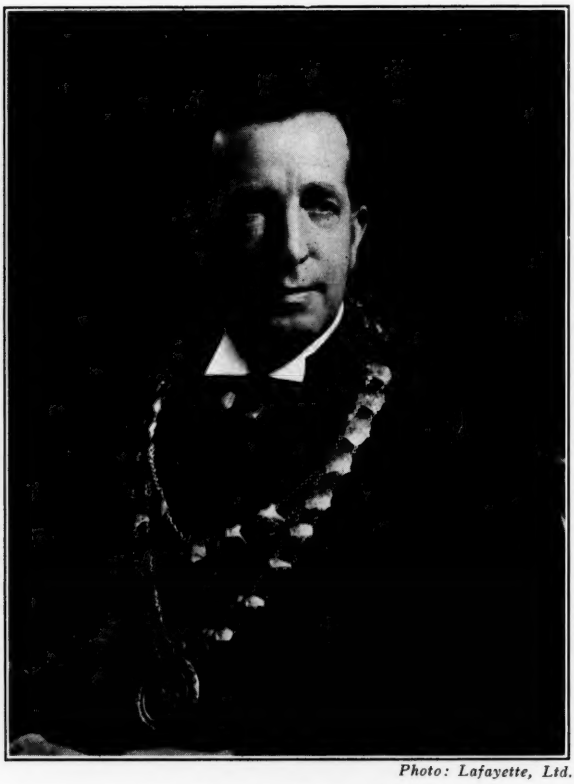

Photo: Lafayette, Ltd.

CAPT. DONALD CAMPBELL, M.R.C.V.S.

President of the Congress of the National Veterinary Medical Association of Great Britain and Ireland.

CAPT. DONALD CAMPBELL

President of the National Veterinary Medical Association.

THE Council of the National Veterinary Association chose wisely when they selected Capt. Donald Campbell to be their President. Always of a "live wire" temperament, he has made the proceedings of the "National" go "with a swing."

1937-38 has been a very important year, for there has not only been the ordinary routine of the working of a big Association but the commencement of the working of the new State Veterinary Service—and in each of these the President's help has been invaluable. No day has been too long and no work has ever been forgotten which was for the benefit of the Association and the profession; and Capt. Campbell's forceful, but genial, tact has invariably carried the day. It will be with regret the present members will see his year of office close, but he will hand over to his successor a N.V.M.A. which has progressed satisfactorily a stage further than the one over which he was initiated as President such a short time ago.

Editorial

THE CONGRESS SEASON

THE year 1938 will be marked in British veterinary history by the fact that within a very few weeks—and, indeed, within a comparatively short distance—of one another there are held two most important Congresses, at which will be discussed subjects of momentous importance in the worlds of agriculture and veterinary science.

Held in Zürich under the distinguished Presidentship of Professor Leclainche, the 13th International Veterinary Congress opens on August 21, and continues in that city until the 25th, the last two days, 26th and 27th, being continued at Interlaken.

The subjects for discussion are, as usual, of International importance, a complete list being given in our subsequent pages. The variety of the titles gives ample opportunity for interesting the members of every branch of the profession; and the same can be said of the Proceedings of the National Veterinary Medical Association, which meets this year at Glasgow—where the visitors and members will also have the privilege of being able to see the great Exhibition which is now there.

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THE LAW IN FRANCE REGARDING VETERINARY SERVICE

In our June issue we published a *résumé* of the law which has been recently passed by the French Senate for the benefit both of the animal owner and the animals themselves, by making it a punishable offence for an unqualified person not only to call himself by the title of "veterinary surgeon" but in any way to act as if he possessed veterinary qualifications or even veterinary skill. In other words, the day of the empiric and the charlatan has come to a close in France, as is already the case in Norway and Spain.

In this month's issue we publish in full the Regulations which control veterinary science in the first-named of these three, and every paragraph will be read with interest by our readers. The status of the "docteur vétérinaire" is exactly of the same standing as the doctor of human medicine, and it is a warning lesson that there must be no "half-way house," in that the granting of a special certificate of "expert farrier" led to such abuse and assumption of power on the part of the recipients—who posed as fully qualified men—that the granting of this certificate has been stopped.

In Great Britain, in order to doctor sick animals one needn't possess any qualification or diploma at all, and it will be of interest to our readers if we draw special attention to the origin of the "special certificate" which, in France, dubbed a man as being an "expert farrier."

We read that the practice goes back to 1815, when by Imperial decree certain veterinarians chosen by the Prefect were obliged to keep a shoeing forge and to train pupils, to whom they could give, after two years' apprenticeship, the certificate of "expert farrier"; and we read that "this experiment marked the origin of veterinary empiricism in France." When one looks around at the difference between the opportunities for learning and scientific study which are now available for the veterinary student of to-day and compares it with the state of affairs which existed even only fifty years ago, the contrast is almost unbelievable. Much more remains to be done, and, in fact, the world never finishes, for the man or woman who believes in a "stand still" policy as being beneficial for the progress of the profession has struck the wrong notion, and everybody must come into line for the benefit of our animal patients, and for our own scientific status.

We in England will all watch with more than ordinary interest the result of this law in France, and the subterfuges which will be attempted in order to evade it, that we may benefit by the example set by them.

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XIIIth INTERNATIONAL VETERINARY CONGRESS

ZURICH - INTERLAKEN 1938

Patron :

FEDERAL COUNCILLOR HERMANN OBRECHT

Head of the Department of Public Economy

To be held at the

FEDERAL TECHNICAL COLLEGE, ZURICH

(Switzerland)

August 21st to 25th 1938

Interlaken August 26th to 27th 1938

Secretaries of the National Committees

Argentine :

Dr. José R. Serres, Professeur et conseiller à la Faculté Agronomique et Vétérinaire de l'Université de Buenos Aires; Lavalle 1938, Buenos Aires.

Belgium :

M. le Professeur van Goidshoven, Recteur de l'Ecole de Médecine vétérinaire de Cureghem, Cureghem-Bruxelles.

Brazil :

Dr. Jorge de Sá Earp, Assistant-Chef de l'Institut de Biologie Animale de Rio de Janeiro.

Bulgaria :

Prof. Dr. St. Angeloff, Direktor des Instituts für Bakteriologie an der Veterinär-medizinischen Fakultät der Universität, Sofia, Sofia.

Canada :

Dr. George Hilton, Directeur Général Vétérinaire, Ottawa, Ont.

Chili :

Prof. Dr. Hugo K. Sievers Wicke, Instituto de Investigaciones Veterinarias, Casilla 4527 — Correo 2, Santiago de Chile.

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Czechoslovakia :
M. le Docteur Fr. Nádvorník, Conseiller au Ministère de l'Hygiène publique, Praha II, Vysehradská 16.

Denmark :
Prof. Valdemar Adsersen, Königle. Veterinär- und landwirtschaftliche Hochschule, Kopenhagen.

Egypt :
Ahmed Farid Bey, Director of Veterinary Services, Ministry of Agriculture, Cairo.

Esthonia :
Prof. Dr. Johannes Kaarde, Leiter der bujatrischen Klinik der Universität Tartu. Ulikooli Loomaarstiteaduskond, Tartu.

Finland :
Dr. R. Stenius, Landwirtschaftsministerium, Helsingfors.

France :
M. le Professeur Dr. J. Verge, Professeur à l'Ecole Vétérinaire d'Alfort, Alfort, Seine, France.

Germany :
Universitätsprofessor Dr. V. Stang, Philippstr. 13, Berlin NW.7.

Great Britain :
Lieut.-Col. P. J. Simpson, F.R.C.V.S., c/o The National Veterinary Medical Association, 36, Gordon Square, London, W.C.1.

Hungary :
Prof. Dr. A. Kotlán, XIV., Tárbornok u. 2., Budapest.

India :
Mr. W. Taylor, M.R.C.V.S., D.V.H., I.V.S., Offg. Director, Imperial Veterinary Research Institute, Mukteswar-Kumaun U.P.

Ireland :
Professor J. F. Craig, President of Veterinary College, Dublin.

Italy :
Prof. Dr. Carlo Bisanti, Ministero dell'Interno, Roma.

Japan :
Prof. Dr. Osamu Emoto, Faculty of Agriculture, Tokyo Imperial University, Hongo, Tokyo.

Mexico :
Dr. Rafael A. Osorio, la Calle de Filomeno Mata No. 6, Mexico, D. F.

Netherlands :
Dr. E. A. R. F. Baudet, Faculté Vétérinaire de l'Université de l'Etat à Utrecht, Biltstraat 168, Utrecht.

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New Zealand :
C. J. Reakes, D.V.Sc., M.R.C.V.S., 1, Pharazyn Street, Lower Hutt, Wellington, N. Z.

Norway :
Prof. Dr. Halfdan Holth, Tierärztliche Hochschule, Oslo.

Poland :
M. le Dr. K. Millak, Colonel vét., Chef de service vét. de C. A. Rédacteur en chef des Wiadomosci Weterynaryjne, Varsovie.

Portugal :
M. le Lieutenant Dr. Mario Candido de Sousa, Médecin vétérinaire militaire, Cascais, prov. de Lisbonne.

Roumania :
Al. Vechiu, Professeur à la Faculté de Médecine Vétérinaire, Secrétaire général de l'Association générale des médecins vétérinaires de Roumanie, Rue Logofatu Nestor No. 11, Bucarest, VI.

South Africa, Union of :
Dr. P. J. du Toit, Director of Veterinary Services and Animal Industry, Department of Agriculture, Onderstepoort, Pretoria.

Spain :
Don Cesareo Sanz Egaña, Director del Matadero y Mercado de Ganados, Madrid.

Sweden :
Prof. Dr. med.-vet. Sven Wall, Statens Veterinärbakteriologiska Anstalt, Stockholm 1.

Turkey :
Muzaffer Bekman, Directeur de la section hygiénique à la direction générale du service vétérinaire, T. B. M. M. Hususi, Ankara.

U.S.A. :
Dr. H. Preston Hoskins, Secretary-Editor, 221 N. La-Salle Street, Chicaga, Ill.

Uruguay :
M. le Dr. Antonio Cassamagnaghi, Faculté de Médecine Vétérinaire de l'Université de Montevideo.

Yougoslavie :
M. Miloutine Guetz, Conseiller vétérinaire à la Préfecture de Belgrade, Président de l'Association vétérinaire yougoslave, Belgrade.

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Time Table

General Meetings are to be held in the Auditorium Maximum in the E.T.H., Slaughter-house Zürich. Meetings of the Permanent

Sunday 21. 8. 38	Monday 22. 8. 38	Tuesday 23. 8. 38
	General Meeting 9.00 I. 1. Veterinary Education under modern requirements. I. 2. The importance of the veterinarian in animal husbandry and in the production of food products of animal origin.	**Sectional Meetings** 9.00 A. I. 4. Anæsthesia. B. IX. 2. Animal diseases under war time. C. IV. 4. Immunity in parasitic diseases. D. VII. 1. Growth and early maturity. E. X. 2. Physiology of the udder.
	Sectional Meetings 11.0 A. I. 1. Recent progress in hæmatology. B. II. 3. Swine influenza. C. III. 1. Malignant Catharral fever. D. VI. 4. Psittacosis. E. X. 1. Physiological fundamental principles for the feeding of domestic animals.	10.30 A. VI. 1. Lymphomatosis. B. VIII. 1. Inspection of tuberculous animals for slaughter. C. VII. 2. Constitution of domestic animals, etc. D. III. 3. Specific Infections of the reproductive organs of cattle. E. IX. 1. Protection against gas.
14.00 Meeting of the Permanent Committee.	13.30 A. II. 1. Tuberculin testing. B. VIII. 3. Estimate of the value of milk. C. V. 1. Tropical and subtropical diseases. D. IV. 3. Pasture hygiene with respect to parasitic diseases. E. 11. 2. Aujeszky Disease and moving picture.	13.30 A. II. 4. Salmonellosis. B. VII. 3. Influence of climate on the constitution, etc. C. VI. 2. Blackhead. D. VIII. 2. Changes in meat, etc. E. III. 4. Surgical demonstration in moving picture. (Götze)
	14.30 D. Meeting of the Committee for Combating parasitic diseases.	14.30 C. VI. 3. Coccidiosis. D. X. 5. Gonadotropic hormones. E. IV. 2. Parasitic diseases of man and animals.
16.00 Opening Meeting in Auditorium Maximum.		15.00 D. X. 4. Physiology of heredity. D. VII. 5. Artificial ensemination
19.00 Evening Reception in the University.		20.00 Official Banquet in the Kaufleuten-Saal, Pelikanstrasse 18, Zürich.

of Meetings

Sectional Meetings in the Auditories A—E, Surgical Demonstrations in the Committee in the Aula of the E.T.H.

Wed. 24. 8. 38	Thursday 25. 8. 38	Friday 26. 8. 38	Saturday 27. 8. 38
Gen. Meeting 9.00 II. General conditions in the origin and development of infectious diseases.	**General Meeting** 9.00 III. Disturbances in animal reproduction.	about 8.45 Transfer to Interlaken by special train.	8.30 Meeting of the Permanent Committee in the Kursaal. Meeting of the Committee for the Budapest prize. Show of cattle for breeding on the Höhematte.
	Sectional Meetings 11.00 A. IV. 1. Parasites of wild animals. B. I. 2. Influence of feeding on the development of diseases. C. V. 2. Geographical distribution of tropical diseases. D. III. 2. Leukosis. E. I. 3. X-ray diagnosis.		10.00 Official Closing Meeting of the Congress in the Kursaal. 12.00 Closing Meeting of the Permanent Committee in the Kursaal.
13.45 **Afternoon** Excursions.	13.30 A. VIII. 4. Modern methods of stunning slaughter animals. B. X. 3. Physiology of the first stomach. C. IV. 5. Helminthic diseases of India. E. VII. 4. Law project on husbandry and herd hygiene for South America. 14.00 III. 4. Surgical demonstrations. Visit of the slaughter-house.	Stop at Berne. about 16.00 Departure from Berne to Interlaken	**Afternoon** 14.30 William Tell Pastural Plays. Reduced prices for Congress Members
		19.30 Banquet for the Official Delegates. 20.30 Evening meeting of the Congress members in the Kursaal.	21.00 Evening Entertainment in the Kursaal.

List of Social Functions.

Sunday, August 21, 1938.

16.00 **Opening Meeting** of the Congress in the Auditorium Maximum of the E. T. H. Zürich.

19.00 **Reception** in the University of Zürich. Buffet offered by the Organising Committee.

Tuesday, August 23, 1938.

20.00 **Official Banquet** in the "Gesellschaftshaus zu Kaufleuten," Pelikanstrasse, 18, Zürich.

Friday, August 26, 1938.

19.30 **Banquet for the Official Delegates** at the Grand Hotel Victoria, Interlaken.

20.30 **Evening Meeting** of the members of the Congress in the Kursaal Interlaken.

Saturday, August 27, 1938.

10.00 **Official Closing Meeting** of the Congress in the Kursaal Interlaken.

21.00 **Evening Reception** in the Kursaal Interlaken.

Organising Committee

President of the Organising Committee: Prof. Dr. G. Flückiger.

I. Vice-President: Prof. Dr. O. Bürgi.

II. Vice-President: Oberst Dr. H. Schwyter.

III. Vice-President: Dr. M. Chaudet.

President of the Finance Committee: Dr. H. Baer.

General Secretary: Dr. E. Gräub.

National Committee for Great Britain

President: Prof. J. B. Buxton.

Hon. Secretary: Lieut.-Col. P. J. Simpson, 36, Gordon Square, London, W.C.1.

Members: J. Willett, Sir John M'Fadyean, Capt. J. R. Barker, Prof. J. F. Craig, Sir Frederick Hobday, Dr. F. C. Minett, Prof. W. M. Mitchell, Sir John Kelland.

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In Auditory E:

X. 1. **Physiological Fundamental Principles for the Feeding of Domestic Animals.**

Reporters:

E 1 Wellmann, Dr. O., Universitätsprofessor, Budapest, Ungarn.

E 2 Sjollema, Prof. Dr. B., Tierärztliche Fakultät der Reichsuniversität Utrecht, Niederlande.

E 3 Quin, J. I., Veterinary Services, Department of Agriculture and Forestry, Onderstepoort, Pretoria, Union of South Africa.

13.30 **Sectional Meetings.**

In Auditory A:

II. 1. **The Value of Tuberculin Testing in the Control of Tuberculosis.**

Reporters:

A 4 Mohler, Dr. J. R., Chief of the Bureau of Animal Industry, Department of Agriculture, Washington, D.C., U.S.A.

A 5 Plum, Dr. med.-vet. N., Abteilungsvorsteher des Staatl. Vet. Serumlaboratorium, Kopenhagen, Dänemark.

A 6 Zeller, Dr. H., Oberregierungsrat im Reichsgesundheitsamt, Veterinärabteilung, Berlin-Dahlem, Deutschland.

A 7 Glover, R. E., M.A., B.Sc., F.R.C.V.S., Superintendent, Medical Research Council, Farm Laboratories, Mill Hill, London, England.

A 8 't Hooft, P. J., Tierärztlicher Staatsdienst, 's-Gravenhage, und

A 8 Veenbaas, Dr. A. H., Vet. Gesundheitsamt der Provinz Friesland, Leeuwarden, Niederlande.

In Auditory B:

VIII. 3. **Estimate of the Value of Milk from a Hygienic Point of View.**

Reporters:

B 4 Grassi, Prof. L., Ispettore generale veterinario al Ministero dell'interno, Roma, Italia.

B 5 Bendixen, Prof. H. C. Königl. Tierärztliche und Landwirtschaftliche Hochschule, Kopenhagen, Dänemark.

B 6 Giltner, Dr. Ward, Dean of Veterinary Science, Michigan State College of Agriculture and Applied Science, East Lansing, Michigan, U.S.A.

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B 7 Brennan de Vine, Major, M.C., F.R.C.V.S., D.V.S.M., Chief Veterinary Officer, City of Birmingham Veterinary and Food Inspection Department, Birmingham, England.

In Auditory C:

V. 1. **Recent Researches Regarding Tropical and Subtropical Diseases.**

Reporters:

C 5 De Kock, Dr. G., Veterinary Services, Department of Agriculture and Forestry, Onderstepoort, Pretoria, Union of South Africa.

C 6 Daubney, R., M.Sc., M.R.C.V.S., Director of Veterinary Services, P. O., Kabete, Kenya Colony, East Africa.

C 7 Carpano, Prof. M., 131, Boulevard Mussolini, Tirana, Albania.

C 8 Kelser, Lt.-Colonel R. A., U.S. Army, Member, Army Med. Research Board, Ancon (Canal Zone), U.S.A.

C 9 Donatien, M. le Docteur A., Chef de Service à l'Institut Pasteur d'Algérie, Alger, et

C 9 Lestoquard, Mr. F., Institut Pasteur d'Algérie, Alger.

C 11 Dschunkowsky, Dr. E., Veterinarian, Dalmatinska 83, Beograd, Yougoslavia.

In Auditory D:

IV. 3. **Pasture Hygiene with Respect to Parasitic Diseases.**

Reporters:

D 4 Mönnig, Dr. H. O., Veterinary Services, Department of Agriculture and Forestry, Onderstepoort, Pretoria, Union of South Africa.

D 5 Taylor, E. L., M.V.Sc., M.R.C.V.S., D.V.H., Ministry of Agriculture and Fisheries, Veterinary Laboratory, Weybridge, England.

D 6 Kondic, Dr. K., Sektionschef der Veterinärabteilung im Landwirtschaftsministerium, Belgrad, Jugoslawien.

In Auditory E:

II. 2. **Aujeszky Disease (Pseudorabies).**

Reporters:

E 4 Bailly, M. le Docteur, Institut Pasteur du Maroc, Tanger, Maroc.

E 5 Köves, Prof. Dr. J., Vorsitzender des Ungarischen Tierärztevereins, Budapest, Ungarn.

GENERAL INFORMATION

The meetings of the Congress will take place in the Eidgenössische Technische Hochschule (E. T. H., Federal Technical College) in Zurich from Sunday, August 21, to Thursday, August 25, 1938. The second part of the Congress will be held at Interlaken on August 26 and 27, 1938.

The Opening Meeting is fixed for Sunday, August 21, 1938, at 16 o'clock in the Auditorium Maximum of the E. T. H. Opening address by the President of the Congress, followed by brief addresses of welcome by the Administrative Authorities and by the Delegates of the Foreign Governments.

The transfer of the Congress to Interlaken, where on August 26 and 27 the second part of the programme will be carried out, will be on Friday, August 26, 1938. Stop at Berne.

From Interlaken, opportunity is offered for shorter excursions into the Bernese Oberland (Jungfraujoch, Mürren, Grindelwald, etc.). There will also be several day excursions to various districts of Switzerland interesting to tourists, to Zermatt (Gornergrat), Lake Geneva (Montreux, Vevey, Lausanne, and Geneva), to Central Switzerland (Lake Lucerne and Lucerne), to the Engadine (St. Moritz), to the Tessin (Lugano and Locarno), etc.

The students of the faculties of Veterinary Medicine of the Universities of Zurich and Berne, have appointed a Committee to receive the students from foreign countries, for the purpose of making their stay agreeable and of being helpful in every way possible. Students attending the Congress in groups are requested to notify Prof. Dr. H. Zwicky, 4, Manessestrasse, Zurich, of their arrival, before the beginning of the Congress.

Application for Membership

Applications for membership of the Congress are to be made to the General Secretary, 23a, Seilerstr., Berne (Switzerland).

The membership subscription is to be sent at the same time as the application form, and is to be remitted in Swiss money to the *Schweizerische Kreditanstalt in Zurich* (account Veterinary Congress). The payment can be made by cheque, postal order, or postal cheque (P. O. Cheque account, Schweizerische Kreditanstalt, Zurich, No. VIII/500).

Membership Subscription

Membership subscriptions are:

Ordinary Members	30 Swiss Francs
Extraordinary Members:	
Other than Students	30 Swiss Francs
Veterinary Students	15 Swiss Francs

The Congress members, if they so desire, can obtain one or more tickets for their family-members, on payment of five Swiss Frs. each.

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Social Functions

1. Sunday, August 21, 1938, at 19 o'clock: Evening Reception in the University, to which all Congress members are invited. Buffet offered by the Organising Committee. Membership card and Congress badge entitle to admission.
2. Tuesday, August 23, 1938, at 20 o'clock: Official Banquet for the members of the Congress, in the reception room of the "Gesellschaftshaus zur Kaufleuten," 18, Pelikanstrasse, Zurich. Price: 12 Frs. per cover, including wine, tips, and cloakroom. Registration on the official application form. Tickets are to be booked as early as possible, and the amount to be sent in with the registration application form. Participants are requested to ask for the tickets for the Banquet at the beginning of the Congress, at the Office of the Secretary of the Congress, in the E. T. H.
3. Wednesday, August 24, 1938, afternoon: Excursions in the vicinity of Zurich. Registration at the Travel Agencies. Latest date for application: Tuesday, 14 o'clock, at the Travel Offices in the E. T. H.
4. Friday, August 26, 1938, at 19.30: Banquet for the Official Delegates, at the Grand Hotel Victoria, Interlaken. The Delegates will be personally invited by the Organisation Committee.
5. Saturday, August 27, 1938, at 21 o'clock: Evening Entertainment for all the members of the Congress at the Kursaal, Interlaken. Members' card and badge entitle to admission.

THE GLASGOW CONGRESS

PROGRAMME

The following is the programme of the Association's Congress to be held in the Empire Exhibition, Bellahouston Park, Glasgow, from September 5 to September 9, 1938:—

Sunday, September 4

8 p.m.: "At Home," as guests of the Scottish Divisions (Central Hotel).

Monday, September 5

10.15 a.m.: Civic Welcome (Concert Hall, Empire Exhibition).

10.45 a.m.: Opening of Exhibition of Drugs, Instruments, Books, etc. (Concert Hall, Empire Exhibition).

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11 a.m.: Paper: "Filterable Viruses, with Special Reference to Immunity" (Concert Hall, Empire Exhibition). Immediately following above paper—Meeting of Society of Veterinary Practitioners (Concert Hall, Empire Exhibition).

2 p.m.: Motor Tour: "Three Lochs" (Loch Lomond, Loch Long, and Gareloch). (Afternoon tea.)

8 p.m.: Civic Reception (City Chambers, George Square, Glasgow).

Tuesday, September 6

10.15 a.m.: Paper: "The Problems of the Practitioner in Connection with the Differential Diagnosis and Treatment of Diseases of Young Pigs" (Concert Hall, Empire Exhibition).

12 noon: Meeting of Ladies' Veterinary Benevolent Guild (Concert Hall, Empire Exhibition).

1.45 p.m.: Demonstrations (Glasgow Veterinary College).

4.30 p.m.: Council Meeting (Glasgow Veterinary College).

8 p.m.: President's Reception (Central Hotel).

Wednesday, September 7

10.15 a.m.: Paper: "The Control of Mastitis in New York State" (Illustrated by lantern slides) (Concert Hall, Empire Exhibition).

10.30 a.m.: Ladies' Golf Competition (Haggs Castle Golf Club).

12.15 p.m.: Annual Meeting (Concert Hall, Empire Exhibition).

1.15 p.m.: Congress Photograph (Empire Exhibition).

2.30 p.m.: Golf Competitions (Cathkin Braes Golf Club).

7 p.m.: Annual Banquet (Central Hotel).

Thursday, September 8

10 a.m.: All-day Excursion by steamer—Clyde, Firth, Kyles of Bute (South Side, George V Bridge Wharf). (Lunch and tea on board).

8 p.m.: Veterinary Benevolent Dance (Ca'dora Restaurant).

Friday, September 9

10.15 a.m.: Three Short Papers (Concert Hall, Empire Exhibition).

12.30 p.m.: Closing Meeting (Concert Hall, Empire Exhibition).
Council Meeting (Concert Hall, Empire Exhibition).

6.45 p.m.: Royal (Dick) Alumnus Dinner (Ca'dora Restaurant).

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SUBJECTS FOR PAPERS

Monday, September 5

(President: Dr. W. S. Gordon, M.R.C.V.S.)
(Vice-President: Dr. R. F. Montgomerie, B.Sc., F.R.C.V.S.)
(Recording Secretary: W. Lyle Stewart, M.R.C.V.S.)

"Filterable Viruses, with Special Reference to Immunity." By Professor Edward Hindle, M.A., Sc.D., F.R.S.E., Regius Professor of Zoology, Glasgow University.

Openers: Professor T. Dalling, M.A., M.R.C.V.S., Cambridge; Major G. W. Dunkin, M.R.C.V.S., D.V.H., Compton, Berkshire; Dr. W. H. Andrews, M.R.C.V.S., Weybridge; Dr. I. A. Galloway, M.R.C.V.S., London.

Tuesday, September 6

(President: P. J. Howard, M.R.C.V.S.)
(Vice-President: F. Beckett, F.R.C.V.S.)
(Recording Secretary: G. A. Sangster, M.R.C.V.S.)

"The Problems of the Practitioner in Connection with the Differential Diagnosis and Treatment of Diseases of Young Pigs." By H. G. Lamont, M.Sc., M.R.C.V.S., Stormont, Belfast.

Opener: G. C. Marginson, M.R.C.V.S., D.V.S.M., Preston.

Wednesday, September 7

(President: J. R. Barker, M.R.C.V.S., D.V.H.)
(Vice-President: Professor J. F. Craig, M.A., F.R.C.V.S.)
(Recording Secretary: O. V. Gunning, D.V.M. [Ohio], M.R.C.V.S.)

"The Control of Mastitis in New York State." By Dr. D. H. Udall, S. D. Johnson and Jean Ferguson, Cornell University, Ithaca, New York.

Openers: W. Nairn, M.R.C.V.S., Blairgowrie; S. J. Edwards, B.Sc., M.R.C.V.S., Ayr.

Friday, September 9

(President: Professor G. W. Weir, J.P., M.R.C.V.S.)
(Vice-President: H. Gillmor, M.R.C.V.S.)
(Recording Secretary: S. G. Abbott, M.R.C.V.S., D.V.S.M.)

No. 1.—"Heel Bug in the Thoroughbred Horse." By A. C. Fraser, B.V.Sc., Ph.D., M.R.C.V.S., Lambourn.

Opener: J. W. Beaumont, M.R.C.V.S., Louth.

No. 2.—"Poultry Husbandry and its Influence on the Incidence and Spread of Disease." By J. E. Wilson, B.Sc., M.R.C.V.S., Edinburgh.

Opener: N. Dobson, B.Sc., M.R.C.V.S., Weybridge.

No. 3.—"Clinical Observations of the Beta Hæmolytic Streptococcal Infection of Dogs." By Tom Hare, M.D., B.V.Sc., M.R.C.V.S., London. Opener: H. W. Steele-Bodger, M.R.C.V.S., Tamworth.

DEMONSTRATIONS

1. Clinical Diagnosis of Blood. Professor J. W. Emslie, M.R.C.V.S., B.Sc. (Agric.), Glasgow.

2. (*a*) Urine Analysis. Professor G. F. Boddie, B.Sc., M.R.C.V.S., Edinburgh, and W. McG. Henderson, B.Sc., M.R.C.V.S.

(*b*) Poisonous Plants. Professor G. F. Boddie, B.Sc., M.R.C.V.S., Edinburgh.

3. Methods of Estimating Worm Infestation in Animals. E. L. Taylor, M.V.Sc., M.R.C.V.S., D.V.H., Weybridge.

4. Methods for Clinical Diagnosis of Skin Conditions. J. W. H. Holmes, M.R.C.V.S., D.V.S.M., London.

5. Methods for Detection of Open Tuberculosis. J. S. Steward, F.R.C.V.S., D.V.S.M.

6. Tuberculin Test in Poultry and Pigs. (To be arranged.)

7. Radiology Section, showing comparative radiographs.
(This display of radiographs will be on view in the Exhibition Room during the whole period of the Congress.)

8. Short Lantern Lecture on Radiology. Berwyn Jones, M.R.C.V.S.

*9. Spinal Anæsthesia in the Cow and Horse and the Technique of Nerve Blocking for Dehorning Cattle. Professor T. G. Browne, M.R.C.V.S., Dublin.

* It is recognised that a number of demonstrations on spinal anæsthesia have been given at previous Congresses within recent years, but these have proved to be of such special interest to a very large body of the profession that the Provisional Committee are confident that the repetition of these demonstrations by Professor Browne will still prove interesting and instructive to many practitioners.

LOCAL SECRETARY'S OFFICES

The Local Secretary will have two offices. One will be at the Central Station Hotel (open on Sunday evening from 7.30 p.m., and on Monday, Tuesday, Wednesday and Thursday, from 9 a.m.); the other in the Concert Hall of the Empire Exhibition (open from 10.15 a.m. on Monday for the remainder of the Congress).

EMPIRE EXHIBITION

Tickets enabling members and delegates to obtain admission to the Empire Exhibition at the reduced charge can only be obtained at the Local Secretary's office at the Central Station Hotel.

SITUATION OF CONFERENCE ROOM AND EXHIBITION

Members and delegates are requested to note that the entrance to the Exhibition in Bellahouston Drive is the one most convenient for the Concert Hall. The Exhibition can be reached by:—(1) Bus or tram via Paisley Road; (2) Train from Glasgow Central Station to Ibrox; (3) Underground to Cessnock and then by tram.

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THE CRUISE

For those who might find it inconvenient to join the steamer at George V Bridge Walk at 10 a.m., it will be possible to leave Glasgow Central Station at 11.6 a.m. and join the steamer at Gourock at 12 noon. The steamer will make a call again at Gourock about 4 p.m. Train fare in addition to cruise: 1st class return, 3s. 4d.; 3rd, 2s. Ticket to be obtained at L.M.S. Booking Office, Central Station.

GOLF

The competitions for the Simpson and Dunkin Golf Trophies, in aid of the Victoria Veterinary Benevolent Fund, will be played on Wednesday, September 7, at the Cathkin Braes Golf Club and Haggs Castle Golf Club respectively, by courtesy of the clubs (see programme).

Both contests will be in the form of a medal round of the course, each competitor playing from his or her lowest handicap. The winner of the Simpson Cup will receive a medal, while the runner-up will receive a spoon, presented by the Congress Committee and Captain Simpson respectively.

Intending competitors are requested to write to Dr. W. S. Gordon, Moredun Institute, Gilmerton, Midlothian, the acting Secretary for the competitions.

PARKING OF CARS

Empire Exhibition.—There are several Parking Places near the Concert Hall.

Civic Reception.—Cars may be parked in Ingram Street, Montrose Street and Royal Exchange Street.

Social Functions in the Central Station Hotel.—There is parking room for about 30 cars at Platform 13 in the Central Station. Cars may also be left in Royal Exchange Square, at the S.M.T. Garage, Waterloo Street, and Prosser's Garage, West Campbell Street.

Veterinary Benevolent Dance (Ca'dora Restaurant).—The S.M.T. Garage, Waterloo Street, Prosser's Garage, West Campbell Street, and Royal Exchange Square are the most convenient.

THE TRADE EXHIBITION AT THE CONGRESS

Not the least interesting part of this gathering is the exhibition of the specialities and commodities put up by the many eminent commercial houses catering for the profession in this country and abroad. We feel sure that our readers when visiting the Exhibitors' Hall will find much of interest to them, for the products of these firms have reached a high measure of excellence. We make every endeavour to ensure that only the advertisements of reliable houses are inserted in the The Veterinary Journal, and in many cases the co-operation of these firms with the profession has been of invaluable assistance. Amongst those exhibiting will be the following well-known concerns, to which a visit, we feel sure, will be amply repaid: The Anglo-American Pharmaceutical Co., Ltd.; Messrs. Arnold & Sons; Messrs. Baillière, Tindall & Cox; Messrs. Genatosan, Ltd.; Messrs. C. J. Hewlett & Son, Ltd.; The International Serum Co., Ltd.; Messrs. Parke, Davis & Co.; Sandoz Products; Willington Medical Products, Ltd.; Willows, Francis, Butler & Thompson, Ltd.; Watson & Sons; T. J. Smith & Nephew, Ltd.; Burroughs Wellcome & Co., Ltd.; Antibody Products, Ltd.; Bayer Products, Ltd.; W. & J. Dunlop, Ltd.; Victor X-rays, Ltd.

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General Articles

REGULATIONS REGARDING THE PRACTICE OF VETERINARY SCIENCE IN FRANCE*

Report made to the French Senate, March 22, 1938, in the name of the Agriculture Commission charged with the examination of a Bill, adopted by the lower House, relative to the practice of Veterinary Medicine,

By M. BORGEOT, Senator.

GENTLEMEN,

The Bill which is the subject of the present Report relates to the regulation of the practice of Veterinary Medicine. It was introduced for the first time on May 30, 1935, by M. Cassez, at that time Minister of Agriculture. This Bill, having fallen through at the end of the 15th legislature, was taken up again on April 27, 1937, by M. Mounet, Minister of Agriculture.

It was supported in the Chamber of Deputies by M. Chapsal, Minister of Agriculture, and passed on January 28, 1938, by 483 votes to 107.

It may be useful to recall that a Bill to the same effect was passed by the Senate on March 29, 1901, on the proposition of M. Darbot, Senator for la Haute-Marne, but this Bill never came up for discussion before the Chamber.

As a matter of history only we may cite the following Bills, introduced by several Ministers of Agriculture, by M. Develle in 1885, M. Faye in 1890, and M. Viger in 1894.

But as long ago as 1841, in the Chamber of Deputies, M. de Montozon called attention to the necessity of controlling the practice of Veterinary Medicine, and the then Minister of Agriculture expressed his view that the amendment of the law asked for was justified. But all these Bills remained a dead letter. After more than half a century of waiting, the question ought now to be ripe, and we think it is time a decision was made.

We think it useful to show, by a brief historical summary, and as clearly as possible, the origin, the aim and the spirit in which this Bill is conceived, and to refute certain unfounded suspicions with regard to it.

At the present time the practice of Veterinary Medicine is free, except as regards diseases reputed to be contagious.

In addition, therefore, to Veterinarians and Doctors of Veterinary Medicine holding diplomas from the State Schools, and in competition with them, there are a great number of persons, having undergone no special course of study and possessing no diploma of any kind, in short, without any professional training, but who examine and treat diseased animals.

This practice goes back to 1815, when by imperial decree certain

* Translated from the French by Dr. Fred Bullock, L.L.D.

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Veterinarians chosen by the Prefect were obliged to keep a shoeing forge and to train pupils to whom they should give, after two years' apprenticeship, a certificate of "Expert Farrier."

Numerous abuses having been found to follow the award of these certificates, the decree of 1815 was abrogated in 1825. But it was already too late and this experiment marks the origin of veterinary empiricism in France.

Moreover, it was to counteract the ignorance of the empirics of his time that Bourgelat created in 1763 the Veterinary School of Lyons and in 1766 that of Alfort. The Toulouse School was not founded until 1828.

It is not our business here to trace the history of Veterinary Medicine, but it is proper to pay a tribute to the teaching which has been given for more than 150 years in our State Veterinary Schools by eminent professors, of whom a great number have been or are great scientists who contribute largely to the diffusion and spread of French Science throughout the world.

Candidates for admission to the Veterinary Schools, who must all have passed the baccalaureât or have received a diploma in agricultural or agronomic engineering, have to sit for a difficult entrance examination, including tests similar in all respects to those for the Natural Sciences Baccalauréat.* Veterinary students have to undergo a four years' course of theoretical and practical studies and to pass the complete series of examinations, which is the necessary preliminary permitting them to submit a thesis and to defend it before a Faculty of Medicine, in order to obtain the Diploma of Docteur Vétérinaire, which is exactly of the same standing as Doctor of Medicine.

All that is known relative to the rational breeding of animals, the medicine and surgery of animals, the practice of their special pharmacy, the control of epizootics, the inspection of foods of animal origin, hygiene and public health is familiar to Veterinary Surgeons.

In view of our knowledge of their value, and of the eminent services they render to agriculture, one is quite rightly astonished to find that empiricism still flourishes in France as it did in the time of Bourgelat. Empiricism, indeed, becomes bolder from day to day, and from being a mere invader of the field, as he is to-day, the empiric will soon swamp it if we do not put a stop to quackery of this kind. The empirics who call themselves "Expert Farriers" have, indeed, grouped themselves together in a National Federation, and have created a pseudo-professional school, with correspondence courses; they have gone so far as to pretend they have official recognition.

The Act of 1881, Sec. 12, and the Act of 1898, Sec. 40, prohibit the practice of Veterinary Medicine in cases of diseases reputed to be contagious, except by persons who possess a veterinary diploma, but we owe it to the truth to say that these Acts have failed in their aim. The empiric has only

* Equivalent to our English Matriculation Examination.

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to fail to recognise the nature of a contagious disease in animals committed to his care and he will escape any penalty.

In the majority of cases the empiric carefully avoids declaring any disease to be a contagious disease, and uses every effort to prevent the access of a Veterinary Surgeon to the farm.

It follows, therefore, that when contagious diseases which are particularly virulent are raging, as foot-and-mouth disease is at the present moment, the empirics are the most active propagators of contagious diseases and they tend to become veritable plagues.

The only protection now accorded to the diploma awarded by our Veterinary Schools is that given to the Act of July 31, 1933, which established the veterinary doctorate. It consists in the monopoly of the title, which no one may take or use unless he has gone through the prescribed course at one of the Veterinary Schools and passed the prescribed examinations. But, apart from this inability to make use of the title, at least in any public manner, empirics may freely practise a profession for which they have undergone no preparation.

Beyond and above the interest of Veterinarians and that of the empirics, of whom a few, it is granted, may render useful services, but of whom the majority deprive the district in which they practise from enjoying services truly enlightened and instructed, so that their own old-fashioned and inefficient practices may be perpetuated—beyond all these personal interests which are always in conflict, there is the general interest of agriculture which demands that the practice of the medicine of animals shall be of the highest scientific standing, and consequently the most prolific in results, and that it shall be reserved to those who have received in the State Veterinary Schools that theoretical and practical training which is indispensable.

In certain regions agriculturists complain that in order to find a Veterinary Surgeon they have to go six and sometimes ten or fifteen miles. That may be. But it is proper to say that motor transport had entirely modified the conditions of practice. It enables, with the assistance of the telephone, a Veterinary Surgeon to attend far more quickly, and to cover an area far more extended.

But the principal cause of the numerical insufficiency of Veterinary Surgeons in certain regions is to be found in the large number of empirics which abound.

When Veterinary Surgeons are protected their number will increase progressively, and they will gradually replace the empirics to the greater good of our cattle.

Moreover, when distances to be covered are equal, the intervention of the Veterinary Surgeon is not more costly than that of the quacks. In the regions of the west, especially, they travel by car as Veterinarians do, and some of them charge fees just as high. Sometimes the fee for a visit is slightly lower, but, as they are frequently puzzled in many cases, they have to repeat their

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visits, they try everything, and each time they distribute large quantities of medicine to try to save the patient. The same disease treated by the quack and by the Veterinarian may in the end result in an account as big in the one case as in the other, often less in the case of the Veterinarian, because having been able to make a more rapid and more precise diagnosis, he has been able to apply a more rational method of treatment, using only those remedies which are necessary.

In other respects it would seem that a certain confusion has arisen between the profession of Expert Farrier and that of Shoeing Smith. It is necessary to distinguish between them.

The shoeing smith of a village as a rule undertakes only shoeing, and more especially repairs to agricultural machinery and implements. In all times he has been the natural helper of the practising Veterinary Surgeon, giving him a disinterested and valued collaboration, and under his direction rendering services of great value to owners of animals.

The empiric who takes the title of Expert Farrier is expert neither in shoeing nor in Veterinary Medicine. He knows nothing about shoeing, has never practised it, and his veterinary knowledge is of the most rudimentary kind. That does not hinder him from diagnosing diseases with the assurance which always accompanies ignorance, and giving medical treatment by supplying in the form of pharmaceutical preparations medicaments which are often useless, sometimes harmful, but which he declares to be indispensable for the sure of the sick animal. They also practise certain surgical or obstetrical operations which are not without danger to the animal's life.

It may be said that in many cases there is a deliberate exploitation of the ignorance of the owners of animals.

The revenue of French agriculture represents a total of 100 milliards of francs (100,000,000,000 francs), and the value of our national livestock is about 60,000,000,000 francs, a figure which corresponds to a normal population of about 37 million animals. The livestock of France, therefore, takes an important place in our national wealth, and that there should be a general interest attaching to its preservation and increase is easily understood. Your Commission of Agriculture, therefore, whose duty it is to consider agricultural questions in every form from every point of view, is of opinion that the present conditions of veterinary practice need to be modified by putting an end to empirical practices which are detrimental to livestock and which throw discredit on a profession which includes so many learned men.

Among the Veterinarians who have brought lustre upon the profession we would mention Daubenton, Huzard, Gilbert, Lafosse, Renaud, Delafond, who brought to Zootechny and to Pathology, that is to say to the breeding and medicine of animals, the fruits of their labours and of their discoveries. Bouley, who was President of the Academy of Medicine and of the Academy of Sciences, and who at the end of his glorious career gave his support with

all the power of his great knowledge and eloquence to the genius of Pasteur.

Chauveau, son of a shoeing smith, and his pupils, Arloing, also a shoeing smith's son, Toussaint and Laulanié, who considerably increased our knowledge of Anatomy and Physiology.

The illustrious Nocard, who, in association with Pasteur and Roux, was one of the first and most brilliant bacteriologists of the last century.

Need we enumerate the University Veterinarians known everywhere by their works—Colin, Lucet, Kaufman, Trasbot, Cadiot, and more recently Leclainche, Vallée, Barrier, Ramon, Guérin, Moussu, Gabriel Petit, Martel, Brocq Rousseu, etc.

In 1937 Professor Leclainche was President of the Academy of Sciences, and M. Martel President of the Academy of Medicine.

The Veterinarian Ramon, Assistant Director of the Pasteur Institute, discovered and defined the anatoxines, thus making possible a vaccination, which is efficacious and safe, against diphtheria, tetanus and a number of other microbial infections.

It was Guérin, of the Pasteur Institute, who, with the lamented Dr. Calmette, immortalised his name by the discovery of the B.C.G. vaccine against tuberculosis, the use of which both for children and cattle is now becoming general.

It was Professor Vallée who, with Carré, discovered the plurality of the virus of foot-and-mouth disease, and who has accurately described the technique of hemo-prevention and hemo-vaccination which at this present moment are the only efficacious procedures to be employed in the control of foot-and-mouth disease.

Again, is it not amongst Veterinarians that we find the masters of the science of Zoology, such as Magne, Sanson, Cornevin, Baron, Dechambre—all specialists whose opinion is listened to on questions of breeding?

We could continue to quote many other eminent Veterinarians. We have limited ourselves to naming a few among them who, in the fields of Biology, of Experimental Medicine and Pathology, are in the front rank of world science.

Moreover, there is not a county, not a district, where Veterinary Practitioners and Veterinary Officers are not constantly working for the defence and the betterment of our herds and where, by their daily repeated advice, by the authority of their knowledge and often by their example, they are introducing into the minds of stock-owners better and more beneficial notions of animal and human hygiene and progress in animal husbandry.

The profession, therefore, renders the most eminent services in France to hygiene and public health, to stock-raising and to agriculture in general. It brings its valuable collaboration to scientific progress. It plays a most important social role.

For all these reasons the Veterinarians to whom we owe the duty of

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paying this merited tribute have the right to live by means of their profession without being subject to the competition of a dangerous and often deadly empiricism, all the more because their diplomas, conferred by the State, give them the mission of caring for and curing animals.

The majority of countries have earlier than ourselves undertaken the regulation of veterinary practice. Successively Belgium (1850), Spain (1856), Holland (1874), Italy (1856), Great Britain (1881), Germany (1936), Hungary (1888), Eire (1931), Switzerland, Bulgaria and the great States of South America, e.g., Uruguay (1926), Brazil (1933), Colombia (1930), have regulated the practice of Veterinary Medicine. The Union of South Africa in 1933 has set up a similar regime.

In fact, nearly all nations possessing a regular system of veterinary training have given a sanction to veterinary study by the delivery of an official diploma which alone gives the right to practise. And France, which was the cradle of veterinary education, remains at the present hour one of the few countries where the veterinary diploma conferred by the State does not assure to the holder any legal protection and where empiricism may freely develop to the great damage of agriculture.

On the other hand, the immense majority of farmers through the medium of their associations have long demanded an Act to regulate the practice of Veterinary Medicine.

The French Bureau of Breeding and the National Federation of Agricultural Associations have passed resolutions to the same effect.

In addition, following the decisions of the Permanent Assembly of Presidents of Chambers of Agriculture, the Chambers of Agriculture were invited to consider the question in 1936. Of seventy-three County Chambers and four Regional Chambers, seventy of the first class and three of the latter declared themselves in favour of the proposal. A few have even asked that the Bill should be strengthened in certain respects so as to reduce as far as possible the number of empirics and the period of time during which they may continue to practise.

Finally, we would add that the Academy of Medicine, the Veterinary Academy, the University Bureau of Statistics at the Ministry of Education, and the Federation of Intellectual Workers have recognised the project as being well founded, and they give it unreserved support.

It may therefore be said that a law protecting veterinary practice has received almost unanimous support throughout the country.

These general considerations amply justify the principle of the proposed Bill, which is of importance to agricultural economy, sanitary police and public health.

The Bill which is submitted to your deliberations, without pretending it satisfies everybody, has at any rate taken into account all sides of the question.

No one can in truth declare himself hostile to the principle of the

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Bill, and we pay our tribute to the Chamber which gave it full approval. The first step to take, therefore, is to reserve in the future the practice of Veterinary Medicine to Veterinarians and Veterinary Doctors only. This is provided for in the first five articles of the Bill, which have been adopted without comment by the Chamber. An exception is, however, made in regard to treatment given by shoeing smiths to diseases of the foot, the operations of castration of animals other than equidæ, and first-aid emergency treatment —other than cases of contagious disease—which will not come within the purview of the Act.

Moreover, the Bill cannot constitute a menace for anybody. It is not intended to suppress empiricism to the extent of impliciting hardship in any case of a practice already in existence. Special provision is made in favour of unqualified persons who at this present moment are giving treatment to sick animals. This provision is set out in Art. 6, which prescribes that these persons will be authorised, within the limits of the law, during their lifetime to carry on such practice. The sons of empirics must, however, apply to the Veterinary Schools for the instruction which their fathers cannot give them.

Your Commission of Agriculture cannot but approve the care taken by the Chamber to act with equity in such cases.

Finally, it is in the public interest to lay down penalties against those who in future shall in spite of the law give treatment to animals. The prescribed penalties, which are not very heavy, are set out in Art. 7.

In conclusion, the progressive disappearance of empiricism will gradually ensure the substitution of Veterinary Surgeons for empirics. This new regime will open up avenues for clever young men and will have an immediate reaction in the recruitment of the Veterinary Schools, the conditions of entry to which will be widened. It will then be necessary for the Government, in the course of this period of transition, to provide for the requirements of agriculture in supplying for the whole country the number of Veterinary Surgeons needed.

In view of these considerations, we ask you in the name of the Commission of Agriculture to pass without modification the Bill which is the result of the deliberations of the Chamber of Deputies.

(*N.B.*—The Bill was in fact passed by the Senate and became law on June 17, 1938.)

Article 1.—Those persons only are authorised to practise the medicine and surgery of animals who are of French nationality and possess the State diploma of Veterinary Surgeon, or the State diploma of Veterinary Doctor.

Article 2.—Veterinary Surgeons or Veterinary Doctors alone will be called upon by administrative authorities for all acts within their competence.

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Article 3.—Every Veterinary Surgeon or Veterinary Doctor desiring to practise his profession must, within a month of setting up in practice, register (gratis) his diploma at the prefecture of his departement and at the registry of the civil tribunal of his county. If he removes his residence to another departement, he must renew his registration within a month.

Article 4.—Each year in each departement a list shall be set up bearing the names, residence, date and source of diploma of the Veterinary Surgeons or Veterinary Doctors referred to in the Act. This list will be posted in every commune of the departement.

Article 5.—Any person who is not qualified as stated in Article 1, who shall habitually, with or without remuneration, practise the medicine or surgery of animals, will do so illegally.

Nevertheless, treatment by shoeing smiths of diseases of the foot, the operation of castration of animals other than equidæ, and emergency treatment (except in cases of contagious disease) will not be held to come within the Act.

Article 6.—As a transitory provision, and notwithstanding Article 1, persons of French nationality who are at the date of the passing of this Act actively practising Veterinary Medicine and Surgery are authorised, within the limits of the law, to continue during their lifetimes the practice of their profession. Such persons must arrange for the entry of their residence on a special register kept at the prefecture of their departement, which register will be closed two months after the passing of the Act.

Under the same conditions, persons of French nationality aged from 17 to 25 or over may demand their provisional entry on the register if they have been under apprenticeship for at least one year at the date of the passing of the Act. The final registration giving such persons the right to practise Veterinary Medicine and Surgery within the limits of the law will not be accorded to them until they can bring proof of having accomplished three years' apprenticeship.

The preceding provisions are applicable to foreign Veterinarians exercising the profession in French territory before the passing of this Act.

In case of litigation as to the right to be registered provided for above, the Prefect will give judgment after taking the advice of a commission composed of an official of the prefectorial administration, the departemental Director of Veterinary Services, and a member elected by the Chamber of Agriculture.

Persons of foreign origin having obtained French nationality before the passing of this Act and holding a diploma as Veterinary Surgeon or Veterinary Doctor, awarded to them as foreigners either abroad or in France, and who are practising their profession on French territory before the passing of this Act, are authorised to enjoy the rights and prerogatives attached to the French State diploma of Veterinary Surgeon or Veterinary Doctor. Such

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persons must, if they do not wish to lose their rights, demand within two months of the passing of this Act the registration of their residence at the prefecture of their departement in the list of Veterinarians provided for in Article 4.

The same provisions are applicable to persons of French nationality holding foreign veterinary diplomas and practising in France before the passing of this Act.

Article 7.—Any infraction of this Act will be punishable with a fine of 16 to 50 francs. A repetition of the offence will be punished with a fine of from 100 to 500 francs.

These provisions do not apply to the owners of the animals treated.

Article 8.—A Public Administration Order will make the present Act applicable to Algeria, the Colonies and Protectorates.

REMARKS ON AN OUTBREAK OF EQUINE INFLUENZA AND PNEUMONIA

By A. C. FRASER, Ph.D., B.V.Sc., M.R.C.V.S.
Lambourn, Berks.

DURING the winter of 1937-38 a number of Shire horse studs in the South of England suffered from an outbreak of influenza. The following notes refer to a series of cases which began in a stud of pedigree Shire horses and spread to working farm horses and to a stud of thoroughbred mares on the same estate. The influenza condition was accompanied or followed in practically every case by pneumonia caused by a hæmolytic streptococcus.

There were seventy-five horses on the estate. Thirty-three were inoculated with an autogenous vaccine prepared from cultures of the hæmolytic streptococcus, leaving forty-two uninoculated. During this outbreak nine vaccinated and fourteen unvaccinated animals were affected. Of the fourteen unvaccinated animals seven died; of the nine vaccinated animals none died. This statement requires some minor qualifications, but the qualifications do not detract from the claim for the autogenous vaccine that it was responsible for the reduction of the mortality rate from 50 per cent. to nil.

The vaccine was prepared by the Veterinary Research Laboratories from a strain of *S. hæmolyticus equi* recovered from the blood of one of the fatal

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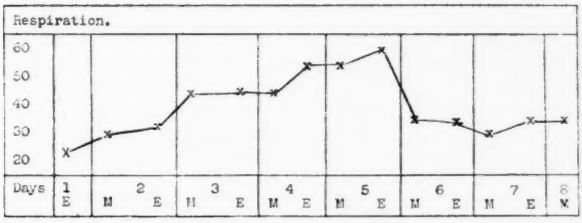
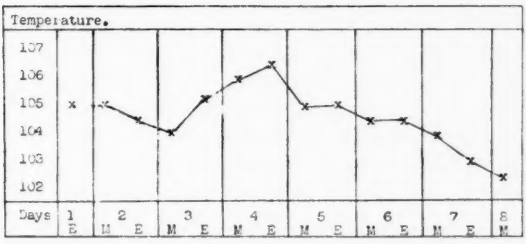
cases at autopsy. The vaccination treatment consisted of six injections at intervals of four days. One of the fatal cases showed symptoms of the disease seven days after the vaccination had commenced—after receiving only two doses of the vaccine, and it has therefore been classed as unvaccinated. One unvaccinated animal was shot at the height of the disease in order to obtain material for research and this one was added to the list of fatal cases. The disease was responsible for two other deaths. Two brood mares foaled soon after contracting the infection. One foal was born dead and the other only lived for five days.

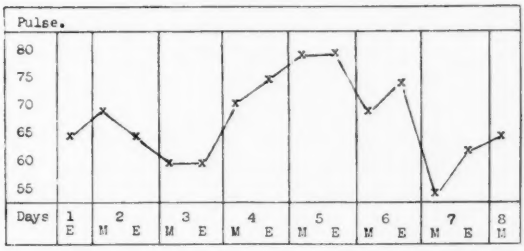
Although many of the animals were turned out they were all being fed twice a day. The first sign of the disease was that the animal left its food. The temperature was then 104 to 106 and the heart beat about sixty per minute. There were no other signs. The temperature remained high without marked fluctuation for two days and then began to drop steadily. During these first few days the animal developed a moist throaty cough and showed signs of difficulty in swallowing. Three or four days from the commencement of the attack the temperature began to rise again and the rate of breathing increased to such an extent that the subjects could be said to "blow." A typical lobar-pneumonia developed from which the patient recovered or died. In all the fatal cases the animals died from peracute congestion of one or both lungs. This was the chief, and usually the only lesion. The variations in temperature in every case followed very closely the course outlined above—a commencing high temperature followed by a fall which was succeeded by a further rise accompanying the onset of pneumonia. The temperature in those cases which recovered fell very steadily and deliberately by about half a degree every twelve hours.

Details of a typical case are shown on the following charts.

		Respiration.	*Temperature.*	*Pulse.*
Day 1.	E.	22	105	64
Day 2.	M.	29	105	68
	E.	32	104.4	64
Day 3.	M.	44	104	60
	E.	45	105.2	60
Day 4.	M.	44	105.8	72
	E.	54	106.4	76
Day 5.	M.	54	104.8	78
	E.	60	105	80
Day 6.	M.	36	104.4	68
	E.	35	104.4	74
Day 7.	M.	32	103.8	55
	E.	34	103	63
Day 8.	M.	34	101.8	66







ARTICLE BY A. C. FRASER, Ph.D., B.V.Sc., M.R.C.V.S.
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Infection

The question of transmission of infection in this outbreak was and remained a puzzle. The pedigree Shires were all turned out singly or in groups of two, three or four, in paddocks with double fences wide enough to prevent the animals reaching one another. The working horses were stabled all night, six in a stable. The thoroughbred mares ran out all together in large paddocks and were in separate loose boxes at night. The original infection was probably acquired by contact with animals at a show, although several weeks had passed after the last show attended by these animals before the first case occurred on the estate.

Three cases occurred in October. All three were in Shire fillies in show condition and all were rapidly fatal. A pure culture of the streptococcus was recovered from one of these animals and vaccination was proceeded with.

In November no cases occurred and the outbreak was considered to be over.

On December 1 two working horses in a stable a mile from the Shire stud developed the disease. There were no more cases for three weeks and again the outbreak was considered to be over, but on December 22 another working horse became infected and a Shire colt on December 29. Eight cases occurred in January, one in February, three in March and four in April. There have been no further cases. (August, 1938.)

A curious example of what appeared to be natural resistance followed later by infection occurred among the foals. On January 22 two unvaccinated foals of the previous year refused their food and were found to have high temperatures. They were brought into an airy half barn and housed there during treatment. A third foal was brought in too as there was no mate available for her and it was not safe to leave her out alone. She stayed in the barn with the other two until they were all turned out again on February 12, and during this period, although the two affected foals developed pneumonia, she showed no deviation whatever from normal health. On March 22, two months after the other two foals had shown the first signs and five weeks after they had recovered, she developed the disease in its typical form and it ran the usual course with a lobar pneumonia and a temperature up to 106 deg. F. In the face of facts like these one's ideas of transmission of infection get rather shaken and one has to fall back on generalisations regarding " an essential receptive state of the patient as a factor in infection," while the attendants begin to wonder if it is really necessary to take ordinary precautions as directed.

Incidentally, these three unvaccinated foals made very rapid and satisfactory recoveries. The filly foal, which developed the disease in March, was left out (March was very mild) and received a minimum of treatment, losing very little condition and making a splendid recovery.

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Treatment

No conclusions as to the efficacy or otherwise of any form of treatment were arrived at as a result of this series of cases with the exception of the value of the vaccine. The disease appeared to run in a set course irrespective of attempts at treatment. Sodium chloride with Bayer's Istin given by the stomach tube in two or three gallons of water proved very satisfactory as a laxative, while formalin electuary seemed to be rather better in its effects than an electuary based on chlorodyne. Antistreptococcic serum in doses up to 100 c.c. and Prontosil intravenously in doses of 125 and 250 c.c. were used without any marked effect. This was disappointing as Prontosil has been reported as very helpful in streptococcic pneumonia in the horse.

After Effects

In those cases that recovered the only effect of the disease that remained for any length of time was the strain thrown on the heart. This was very clearly illustrated in the case of a thoroughbred mare (vaccinated) due to foal on April 7, which contracted the disease on March 19. By March 27 she was nicely out of the wood with temperature and appetite normal and a pulse rate of 50. She began to foal on March 28 at 5 a.m. and she fainted at 5.15, remaining quite unconscious for nearly two hours. Meanwhile the foal had his head and forelegs free and was whinnying and struggling but could not be moved. At 7 a.m. the mare came round and completed the foaling. The foal was lively but could not stand and he was kept alive for five days. The mare's progress was uneventful.

Another vaccinated thoroughbred mare which contracted the disease foaled a full term dead foal just as she passed the acute stage of the disease on the fifth day. She also made favourable progress.

The other mares which were vaccinated when five to seven months in foal carried their foals to full term and produced normal healthy offspring. This point is of some importance as the question of the risk of vaccinating in-foal mares had been raised.

Post-mortem Findings

The most striking finding on post-mortem examination of the animals that died was the absence of any lesions other than in the respiratory tract. The contents of the abdominal cavity appeared to be quite normal and healthy in every way except for a fatty infiltration of the liver in three of the Shires which were in show condition and a single case in which there was acute inflammation of the kidneys. The animals all showed a remarkable freedom from internal parasites, but it was not determined whether this was connected with the use of sodium chloride in their treatment or was a true indication of the condition of the animals on the estate. There was some infestation of

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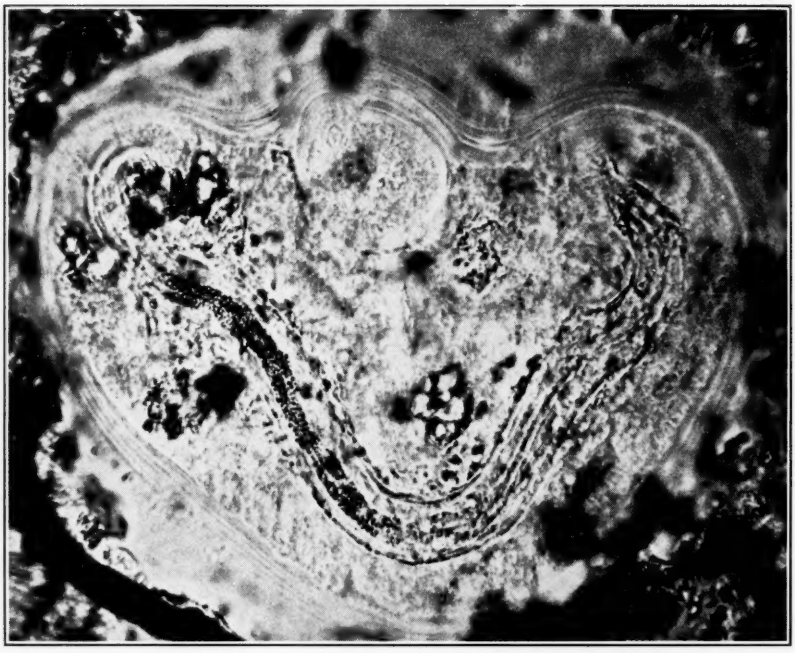

FIG. 1.

GAPEWORM LARVÆ IN A CYST FROM THE MUSCLE OF AN EARTHWORM.

ARTICLE BY E. L. TAYLOR. PAGE 327.

the anterior mesenteric artery in every case. None of the horses on the estate have a heavy infestation according to the result of sugar flotation tests of the fæces.

Summary and Conclusions

In an outbreak of influenza and pneumonia amongst horses, an autogenous vaccine appeared to reduce the mortality rate from 50 per cent. to nil. Of the unvaccinated animals which contracted the disease, foals quickly recovered while animals in show condition succumbed in a few days. The chief after-effect of the disease was strain of the heart.

AN EXTENSION TO THE KNOWN LONGEVITY OF GAPEWORM INFECTION IN EARTHWORMS AND SNAILS

By E. L. TAYLOR, M.V.Sc., M.R.C.V.S.
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THE longevity of parasitic worms is a matter for the astonishment of those who have no special knowledge of the helminithological literature. Tavassor reported an observation on an infestation of *Diphyllobothrium latum* which had been carried by the human host for 40 years. Penfold reported an instance of *kænia saginata* living for 35 years, Fairley an instance of *Schistosoma* living for 30 years, and there are many other surprising reports of the great longevity of parasitic worms.

Although the intermediate stages of some species are rather short-lived, it is the rule for these to be able to await transference to the secondary host for a very considerable time. Particularly does this apply to larval forms living in invertebrates when it is unusual for there to be any marked reaction on the part of the host.

The longevity of *Syngamus* larvæ in the earthworm as shown by observations carried out at Weybridge is an interesting case in point. The continuation of observations published in the *Journal of Comparative Pathology and Therapeutics* for June, 1935, has shown that *Syngamus* larvæ may remain alive and infective in the muscles of earthworms for 4 years 4½ months; 3½

years having been the maximum period observed at the time of the previous publication.

Fig. 1 shows one of the larvæ recovered by digestion from the muscles of an earthworm and is particularly interesting on account of the thick cyst wall which surrounds it; an unusual reaction on the part of an invertebrate host.

Figs. 2 and 3 show gapeworm larvæ in the tissues of a snail, one in the salivary gland and one in a nerve ganglion. The nerve ganglia appear to be a predilection seat. In one particular snail larvæ were found in the following positions: three in the tissues of the body wall, one in the foot, one in the body cavity, one in the hemaphrodite gland, one in the liver, one in the salivary gland and 15 in the nerve ganglia of the head.

Continuation of observations reported in the above-mentioned paper showed that snails are able to carry the infection for one year one and a half months, and it is probable that that period is nowhere near the end point, which probably coincides with the longevity of the snail. According to Boycott *Helix aspersa* lives for five or six years and the common earthworms are reported to be some ten years, so that the gapeworm is well fortified against a prolonged period of the absence of suitable secondary hosts.

THE INDUCTION OF ŒSTRUS IN THE EWE

By J. ANDERSON, M.R.C.V.S.

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Much of our knowledge of the hormones associated with the reproductive processes has been obtained from the smaller laboratory animals and while the broad principles that have evolved from such studies are probably directly applicable to the larger domesticated animals, it is desirable that the action of the various hormone preparations should be studied in these animals themselves. It is the object of this paper to present the results of injecting œstradiol benzoate ("Dimenformon," Organon) into high-grade Merino ewes in the anœstrum experienced during lactation.

Comparatively little work has been done on the effect of injecting "œstrin" into the ewe. "Œstrin" is the term used for substances which have œstrogenic properties, i.e., substances which produce changes in the genital tract of ovariectomised rats and mice, similar to those occurring at œstrus.

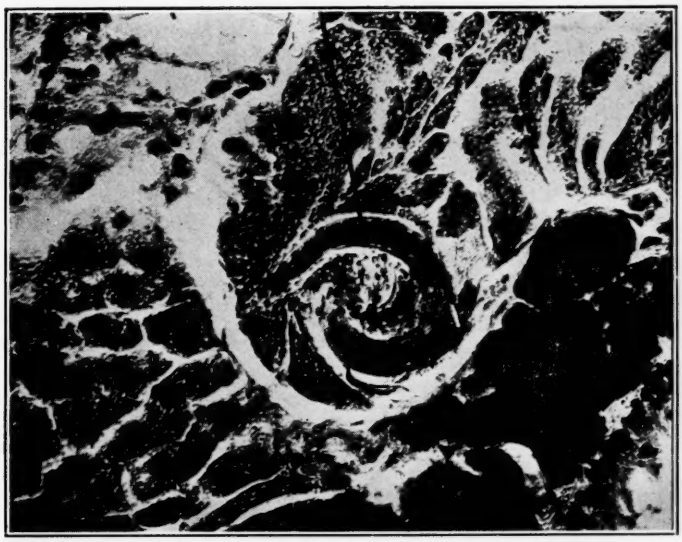

FIG. 2.

GAPEWORM LARVA IN THE SALIVARY GLAND OF A SNAIL. HELIX ASPERSA.

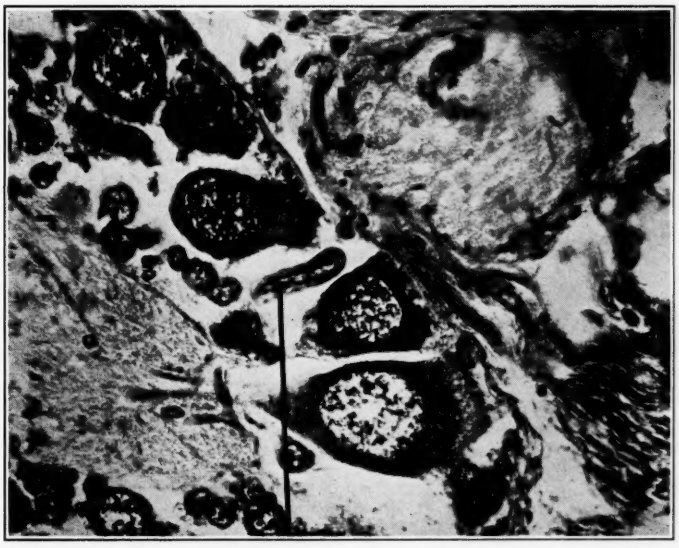

FIG. 3.

GAPEWORM LARVA IN THE PRINCIPAL NERVE GANGLION OF THE HEAD OF A SNAIL. HELIX ASPERSA.

ARTICLE BY E. L. TAYLOR. PAGE 327.

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It is now believed, however, that the substance actually secreted by the ovary is "œstradiol." Cole and Miller (1935) successfully brought five out of seven ewes into œstrus during anœstrum by injecting œstrin. The best results were obtained with doses of 4,000-5,000 R.U. (all three ewes injected came on heat). Of two ewes injected with approximately 500 R.U. œstrin one ewe came on heat, and of two ewes injected with approximately 1,000 R.U. one came on heat. In most cases the injections were made daily on three successive days and heat occurred within three days. The ewes were killed within seven days so that the others might also have come on heat had more time been allowed. Two ewes which were injected over the period of a month (they received a total of nearly 5,000 R.U. œstrin) came on heat within two days after the last injection. Zavadovskii and co-workers (1935) found that œstrin in doses of 1,500-3,000 M.U. was ineffective in bringing ewes on heat outside the normal breeding season. Steffens (1936) obtained good results with Unden and Provetan (œstrogens). Injection of Provetan into Karakul ewes (optimum dose 200,000 I.U.) induced œstrus in 94 per cent. of cases and insemination was effective at the second or third heat period; 13 out of 16 animals receiving 100,000 M.U. of Unden came on heat. This author recommends Provetan when an autumn lambing is desired. Lesbouyries and Berthelon (1938) give the dose of œstrin for the ewe as 30,000 I.U. injected subcutaneously in one or more doses in the course of 2-3 days.

Material and Methods

It has been noted previously (unpublished data) that high-grade Merino ewes in Kenya experienced an anœstrous condition during the period of lactation. Similarly in South Africa it has been found that Merino ewes did not come on heat, when suckling, though spurious ovulation may occur (Roux, 1936). Accordingly high-grade Merino ewes which lambed in October-December, 1937, were used for this experiment. At the time of injection, December, 1937, to January, 1938, these ewes had lambed 30-73 days previously, all the injected ewes were suckling lambs and none had come on heat. 113 ewes were injected and 453 ewes which lambed at the same time as the injected ewes served as controls. 13 of these control ewes came on heat during the time of the experiment; four of these were suckling and nine were dry. The remainder of the control ewes began to come on heat towards the end of March, i.e., four to five months after lambing. It is therefore clear that these grade Merino ewes which are suckling lambs can be safely used to test the effect of an œstrus-inducing preparation since during lactation only a very small number experience heat spontaneously and this occurs mostly in dry ewes.

Œstradiol benzoate ("Dimenformon," Organon) in the form of an oily solution was injected intramuscularly in the thigh. This solution is said to

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contain 50,000 International Benzoate Units per 1 c.c. Appropriate dilutions were made with olive oil for testing different concentrations of the hormone.

Results

Of the 113 ewes injected with œstradiol benzoate 84 (74.3 per cent.) came on heat within 21 days (Table I). The majority of these came on heat in 1-5 days following injection. The next most frequent interval before heat occurred following injection was 16-21 days. Thirteen other ewes came on heat in 22-40 days following injection, but these ewes have been excluded from the results on account of the long interval between injection and heat.

A single injection of 2,500 units was just as effective (five out of seven ewes responded) as single injections of 25,000 units (three out of five ewes responded) and 50,000 units (two out of three ewes responded). There does not seem to be any difference in giving the injections in three doses once daily, or in three doses, a.m., p.m., and a.m. (see results of injecting 3,000 and 7,500 I.U.). 1,000 units in five doses (twice daily for three days and on the morning of the third day) gave slightly better results (100 per cent.) than 5,000 units in one dose (80 per cent.). The maximum response was obtained with doses of 5,000-6,000 units.

An interesting result was that the induction of œstrus by this means started the œstrus cycle in a large number (73 of the 84 ewes that came on heat within 21 days) of the injected ewes. It was noted that with successive cycles the length of the interval between the heat periods tended to approximate more and more to the normal length of the dicestrous interval. Thus the length of the interval between the first and second heat period was 26 days, between the second and third 19 days, betwen the third and fourth 18 days, and between the fourth and fifth 17 days.

The ovaries of a number of injected and non-injected ewes were examined by laparotomy using a local anæsthetic (Table 2). Four non-injected ewes were examined at different periods following lambing; two ewes examined on the 42nd day after lambing showed no corpora lutea and one of these ewes examined on the 55th day after lambing had still not ovulated. One ewe on the 59th day after lambing had two large follicles in one ovary but no corpus luteum and had therefore not ovulated and one ewe that died on the 82nd day after lambing had a whitish old corpus luteum in the ovary. 12-15 injected ewes were operated on before they received œstradiol benzoate. Nine of these ewes showed in their ovaries follicles of various sizes, but no corpora lutea. Two ewes, both 53 days after lambing, had a whitish old corpus luteum in their ovaries and one ewe 35 days after lambing had a small red corpus luteum. Roux's observation that spurious ovulation can occur in the absence of heat during lactation in the Merino is therefore confirmed. It is clear also that follicular growth and regression occurs in the Merino during lactation. The ovaries of seven ewes were examined a few days after the first

induced heat period (No. 123 had not come on heat when she died two days after injection) and ovulation had occurred in two ewes, No. 512 and No. 416 (in the former heat occurred two days after injection and in the latter 16 days). The ovaries of five ewes were examined after the second heat period, i.e., after the heat period which followed spontaneously after the induced heat period). Two of these ewes had recently former corpora lutea and had therefore ovulated at the second heat period. Two of these ewes which had not ovulated at the second heat period did so at the third.

It is clear therefore that œstradiol benzoate (1) can induce œstrus in anœstrus ewes, (2) is capable of starting the œstrous cycle in grade Merino ewes during the lactation period in Kenya, and (3) once heat has been induced it appears that ovulation probably occurs at the second or subsequent heat periods.

Discussion

The majority of the injected ewes that came on heat within 21 days did so within the first five days. It is perhaps a debatable point whether those which came on heat later than five days following injection did so as a result of the injection of œstradiol benzoate. It appears reasonable, however, to suppose that the reproductive system was stimulated as a result of the injection since the control ewes, except for isolated cases, did not experience œstrus at this time. Moreover, it may be significant that there are two peaks of response in relation to time following injection, namely, a few days after the injection and again 16-21 days after the injection, which corresponds roughly to the normal cyclical interval in the ewe. A similar argument might also be applied to those ewes which came on heat 22-40 days after the injection, but for the present this must remain an open question since the interval is rather long and also the time at which some of these ewes at least came on heat was approaching the time when the control ewes began to come on heat.

The question of dosage requires further investigation, but it would seem that the optimum dose is probably in the neighbourhood of 5,000 International Units of œstradiol benzoate and that best results would be obtained by giving this amount in divided doses.

Possibly the most practical point that has emerged from these experiments is that one injection (or a series of injections within a few days) can initiate not merely an isolated œstrus but the full sexual cycle. Within the time limits of the experiment it was found that a considerable number of ewes experienced a second œstrus and some as many as five. It is of interest to note that Steinach, Staheli and Gruter (1934) have found that in sterile anœstrous cows and in pigs a single injection of dihydro-follicular hormone benzoate (50,000 units for cows and 25,000 units for pigs) initiated the full sexual cycle and not merely an isolated œstrous. Likewise Steffens (1936) has found

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that a single injection of Provetan has made conception possible at the second or third heat periods in the ewe.

The question now arises as the possible effect that œstradiol benzoate may have indirectly on ovarian function and particularly on ovulation. In two ewes in this experiment examined a few days after the first heat period following injection of œstradiol benzoate newly-formed corpora lutea were found, indicating that ovulation had occurred. It cannot be overlooked, however, that ovulation in these ewes might have been spontaneous and not due to the action of the hormone since ovulation can occur spontaneously in anœstrous ewes during lactation. Cole and Miller also noted the presence of corpora lutea in the ovaries of ewes receiving œstrin. They concluded that ovulation in these instances was spontaneous and no doubt occurred before the injection of œstrin and independently of it.

The effect of administration of œstrin on the anterior pituitary has been investigated by numerous workers. Castration changes in the pituitary have been prevented by appropriate doses of œstrin (Hohlweg and Dorhm, 1931, 1932) and by ovarian transplants into adult castrated rats (Haterius and Nelson, 1932). It is thought that œstrin increases the secretion of a luteinising hormone by the pituitary (Hohlweg, 1934, Lane, 1935, Wolf, 1935). Lane concluded that the effects of œstrin on the production of gonadotropic hormone(s) by the pituitary occurred in two stages: (1) the early effect was an increased liberation of gonadotropic hormone(s), (2) then occurred a period of diminished liberation and secretion of follicle stimulating hormone and in this stage there was an increased secretion and liberation of luteinising hormone.

It would seem that the injection of œstradiol benzoate into the ewe during the anœstrum of lactation brings about the resumption of the normal œstrous cycle through stimulation of the gonadotropic activities of the pituitary. The delay in the occurrence of heat for 16-21 days in a number of ewes following injection of the œstradiol benzoate would seem to indicate that this hormone has had an effect on the anterior pituitary similar to that which is probably exerted by the œstrus-inducing hormone secreted by the ovaries themselves during the normal œstrus cycle in the ewe.

Summary

The intramuscular injection of œstradiol benzoate induced heat in 84 (74.3 per cent.) of 113 grade Merino ewes during the anœstrous period of lactation. The optimum dose was about 5,000-6,000 I.U. This hormone preparation induced not merely a single heat period but caused the resumption of the normal œstrous cycle probably through its effect on the gonadotropic activity of the anterior pituitary.

Acknowledgment

The author is indebted to Messrs. Organon, Ltd., who very kindly provided the œstradiol benzoate used in these experiments.

REFERENCES.

Cole, H. H., and Miller, R. F. (1935): *Am. J. Anat.*, 57, 39.
Haterius, H. O., and Nelson, W. O. (1932): *J. Exp. Zool.*, 61, 175.
Hohlweg, W. (1934): *Klin. Wschr.*, 13, 92.
Hohlweg, W., and Dohrn, M. (1931): *Wien, Arch. inn. Med.*, 21, 337.
Hohlweg, W., and Dohrn, M. (1932): *Klin. Wschr.*, 11, 233.
Lane, C. E. (1935): *Amer. J. Physiol.*, 110, 681.
Lesbouyries and Berthelon (1938): *Rec. Med. Vet.*, 114, 241.
Roux, L. L. (1936): *Onderstepoort J. Vet. Sci. & Anim. Ind.*, 6,557.
Steffens, M. (1936): *Berl. tierarztl. Wschr.*, 52, 517.
Steinach, E., Staheli, A., and Gruter, F. (1934): *Wiener Klin. Wschr.*, 47, 129.
Wolfe, J. M. (1935): *Proc. Soc. Exp. Biol.*, 32, 757.
Zavadovskii, M. M., Wunder, P. A., Paduceva, A. L., and Margelasvili, S. G. (1935): *Trud. Dinam. Razvit.*, 9, 21.

TABLE I

INJECTION OF OESTRADIOL BENZOATE INTO EWES

No. of Ewes	*Dose of O.B. in I.U.*	*Interval in Days between Injection and first Heat*				*Ewes that came on Heat*	
		1-5	6-10	11-15	16-21	*No.*	*%*
7	2,500 x 1 = 2,500	2	1	1	1	5	70
10	1,000 x 3 = 3,000 once daily	3	1	—	2	6	60
10	1,000 x 3 = 3,000 a.m., p.m., a.m.	4	—	—	1	5	50
20	5,000 x 1 = 5,000	11	1	—	4	16	80
8	1,000 x 5 = 5,000	8	—	—	—	8	100
10	1,000 x 6 = 6,000 twice daily	7	—	1	2	10	100
20	2,500 x 3 = 7,500 twice daily	6	—	2	4	12	60
10	2,500 x 3 = 7,500 a.m., p.m., a.m.	7	—	—	1	8	80
10	2,500 x 6 = 15,000 twice daily	7	—	—	2	9	90
5	25,000 x 1 = 25,000	—	—	1	2	3	60
3	50,000 x 1 = 50,000	2	—	—	—	2	66

Dose—O.B. in I.U. = Œstradiol Benzoate in International Units.

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TABLE II. EXAMINATION OF OVARIES OF INJECTED EWES

No. of Ewe	Lambed	Ovaries Examined	Injected Dose	1st Heat	Ovaries Examined	2nd Heat	Ovaries Examined	3rd Heat	Ovaries Examined
640	3/11/37	—	7/12/37 25,000x1	26/12/37	—	11/1/38	13/1/38 Ovulated		
659	28/10/37	—	7/12/37 25,000x1	26/12/37	—	30/1/38	2/2/38 Ovulated		
512	18/11/37	—	11/ 1/38 2,500x3	13/ 1/38	19/1/38 Ovulated	—	—		
305	16/10/37	8/12/37 1 large follicle in L.O.	13/12/37 2,500x1	28/12/37	13/1/38 Not ovulated	14/1/38	19/1/38 Not ovulated	12/2/38	19/2/38 Ovulated
472	30/10/37	9/12/37 2 large follicles in R.O.	13/12/37 2,500x1	31/12/37	13/1/38 Not ovulated	15/1/38	19/1/38 Not ovulated	—	
196	5/11/37	8/12/37 Small follicles	13/12/37 2,500x1	22/12/37	—	25/1/38	27/1/38 Not ovulated	12/2/38	15/2/38 Ovulated
296	12/11/37	11/1/38 No large follicles	11/ 1/38 2,500x3	28/ 1/38	2/2/38 Not ovulated				
169	1/12/37	11/1/38 1 small red c.l. in L.O.	11/ 1/38 2,500x3	—		—			
L8	27/11/37	11/1/38 1 large follicle in L.O.	11/ 1/38 2,500	14/ 1/38	19/1/38 Not ovulated				
302	26/11/37	11/1/38 Small follicles	11/ 1/38 2,500x3	—		—			
416	13/11/37	12/1/38 Old c.l. in R.O. 1 large follicle in L.O.	12/ 1/38 2,500x3	28/ 1/38	9/2/38 Ovulated	—			
27	21/11/37	12/1/38 No c.l. or follicles	12/ 1/38 2,500xs	—					
84	13/11/37	12/1/38 1 old c.l.	12/ 1/38 2,500x3	—					
340	23/11/37	12/1/38 No c.l. or large follicles	12/ 1/38 2,500x3	—					
123	14/11/37	12/1/38 2 large follicles in R.O.	12/ 1/38 2,500x3	—	Died 14/1/38				

R.O.—right ovary; L.O.—left ovary; c.l.—corpus luteum. Dose—International Units of Oestradiol Benzoate.

BORDER PINE

By J. RUSSELL GREIG and HENRY DRYERRE
Animal Diseases Research Association

and H. H. CORNER and A. M. SMITH
Edinburgh and East of Scotland College of Agriculture

THE term "pine" has been applied generically to a group of diseases of cattle and sheep characterised by chronic progressive debility and physical weakness. The condition known as "pine" which occurs on the Inner Hebrides has been found to represent a nutritional anæmia, which was capable of prevention and cure by the administration of preparations of iron.[1] The condition is similar to, if not identical with, "bush sickness" in New Zealand, described by Godden and Grimmet,[2] and shown by Aston[3] to be determined by pasture containing an abnormally low content of iron. It is also probably identical with "Nakuruitis," in which Orr[4] found that curative response could be elicited by the administration of common salt and ferric oxide. A form of pine in Florida known as "salt sick"[5] is also, in all probability, a closely related condition. The results of the investigation of pine as it occurs in the Hebrides suggested that a similar nutritional deficiency might exist in areas on the mainland of Scotland and possibly in other parts of the country. In collaboration with Mr. John Brown, veterinary surgeon, Invergordon, the Moredun Institute determined the existence of such an area in the region of the Cromarty Firth, and Brown[6] has reported upon the value of iron in the cure and prevention of the disease.

There occurs in the south-eastern counties of Scotland and in Northumberland a well-recognised disease, variously known as "pining," "vinquish" or "daising." Because of its prevalence in the Cheviot area, the condition has come to be known as "Border Pine" or "Cheviot Pine." An early account is given by Hogg, the Ettrick Shepherd,[7] and his observations upon the occurrence of the disease were confirmed and elaborated by M'Gowan and Smith.[8] They found that the disease could be prevented by grazing the sheep on succulent pasture, or by folding them on a "break" of turnips. They suggested that the cause might be a deficiency of an accessory food factor, although it was recognised by these authors that some of the evidence did not support this view.

In 1934 the Animal Diseases Research Association resolved to undertake a systematic study of this disease and, at the same time, one of us in his capacity of Agricultural Organiser for the South Eastern Border Counties proposed to undertake a series of experiments designed to test the preventive effect of minerals as supplements to the grazing. Accordingly, it was arranged that the inquiry should be undertaken as a collaborate investigation

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between the Moredun Institute and the East of Scotland College of Agriculture.

It is the object of this paper to give, in summary form, an account of the disease and the results of the field and laboratory work which, so far, have been obtained.

Conditions of Occurrence

On numerous farms in the Cheviot region upon which pine is prevalent it has been a long-established practice, for the purpose of preventing the disease, to remove the entire sheep stock from the pining areas for a period of about fourteen to twenty-one days in February and/or March, and again for a similar period in August and September, to farms in non-pine areas. In the autumn, the shifted sheep are replaced by ewes, from which the lambs have been weaned ("speaned" ewes), from the non-pining farms to which the sheep are sent, but in February and March the pastures are left vacant. Should the flock not be shifted, but retained on affected land, it is said that pine may occur in an incidence of 60 per cent., especially in the "younger ages."

It is popularly believed that the disease most commonly develops on porphyritic areas, while grazings on sandstone or limestone are not conducive to its occurrence. Both hill and arable ground may be affected, although the condition principally occurs on hill grazings. The delimitations of the pining areas appear to be sharply marked.

Field Experiment, 1934

In December, 1934, it was arranged that one group of forty hoggs be retained on a pining farm near Jedburgh. To twenty of these the following mixture was fed daily:

Oxide of iron	36 per cent.
Steamed bone flour	27 per cent.
Common salt	27 per cent.
A concentrate of vitamins A and D ...	10 per cent.

For the purpose of rendering the mixture more palatable, a small quantity of beet pulp was added. The remaining twenty hoggs received no minerals, but were given an equivalent quantity of beet pulp and were kept on pasture comparable to that of the fed group.

These sheep would ordinarily have been shifted to a non-pine area in February, and it was expected that pine would develop—at least in the control group—during the spring of 1935. Although numerous individuals of both groups developed intermittent scour, no evidence of pine was observed in any of the sheep when the observations were concluded at the end of May. This was unexpected, but a possible explanation may be found

in the fact that beet pulp contains a considerable proportion of minerals, including iron; it was therefore fortunate for our purpose that eight ewes, which were the property of the farmer and which had not been included in the experiment, became affected with pine in June. These sheep had been continuously grazed on hill land and had not been removed from the farm since the previous September. The condition was studied and was found biochemically to resemble the type of pine which had been found to occur in the Inner Hebrides.[1] It was therefore decided to treat four of the most severely affected animals by administering to each daily for one week a draught containing one drachm of iron ammonium citrate. This was followed by six further doses at intervals of two days. The remaining four sheep were retained as controls. The four sheep to which the iron was administered made rapid and complete recovery, while the untreated controls became progressively more severely affected with the disease.

Before treatment was commenced, the average percentage hæmoglobin was found to be 8.0 in the case of the group which was to receive treatment, and 9.9 in the case of the control group. After recovery of the four treated animals, their percentage hæmoglobin rose to 9.1, whereas at the same time the average hæmoglobin value in the four untreated sheep had fallen to 6.8. There was no very marked difference in the weights of the sheep before and after the period of treatment.

In view of these findings, it was resolved to undertake a second experiment on the same farm, and on August 19, 1935, sixty Cheviot "top quality" wether lambs were purchased and divided into two groups, each of thirty in number. To one group there was administered daily for seven days a draught containing one drachm of iron ammonium citrate, and thereafter one dose was given every second day during the following two weeks, i.e., fourteen doses in all. The other group of thirty sheep received no treatment. On September 12, four of the untreated group showed symptoms suspicious of pine, and on October 26 it was observed that thirteen of the untreated group were now affected and that two lambs of the treated group showed the initial symptoms of the disease. On November 12 these two treated lambs were definitely suffering from pine, and twenty-two of the controls were similarly affected. The two pining lambs of the treated group then received another course of iron ammonium citrate, similar to that described above. On December 2 it was obvious that in both of these lambs recovery was rapidly being established, and both were apparently completely cured within three weeks after the commencement of the treatment, whereas four additional sheep of the untreated group, now twenty-six in all, were then severely affected with pine.

On November 4 the hæmoglobin content of the blood was estimated in six each of the treated and the untreated sheep. On December 9 a similar determination was made on the blood of the remaining animals.

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Table I

	Treated		*Untreated*	
	No.	*Hb%*	*No.*	*Hb%*
Blood collected November 4	895	10.5	923	9.4
	897	10.0	938	8.1
	899	10.3	940	7.5
	904	11.0	942	8.6
	909	11.4	947	8.1
Blood collected December 9	891	10.0	921	8.4
	892	11.0	924	10.5
	894	10.3	925	10.6
	896	10.0	926	9.6
	898	9.2	927	10.5
	900	10.4	928	7.2
	901	10.3	930	8.6
	902	10.0	931	9.2
	903	10.4	932	10.0
	905	11.0	933	10.5
	906	9.8	934	8.6
	907	7.7	935	8.8
	908	9.6	941	8.7
	912	11.9	943	10.3
	913	10.0	944	10.0
	914	11.6	945	10.0
	915	10.1	946	11.5
	916	10.3	948	11.4
	917	9.1	949	10.0
	918	11.3	950	9.3
	919	9.3		
	920	10.3		
Average		10.3		9.4

The sheep were also periodically weighed, with results as follow:

Table II

	Average Weight	
	Treated Group (30 *in number*) *lbs.*	*Control Group* (30 *in number*) *lbs.*
August 22	46.2	46.4
September 12	48.71	48.26
October 26	58.71	55.08
November 21	58.5	51.5

Thus, the treated animals gained on the average approximately 12 lbs., the controls approximately 5 lbs.

Opportunity was taken to make a cytological and biochemical examination of the blood in the case of five of the sheep suffering from pine, and evidence was obtained that the condition was essentially that of chlorosis. There was a marked reduction in the number of red blood corpuscles and a corresponding diminution in the hæmoglobin content of the blood.

It is recognised that copper is present in minute quantities in iron ammonium citrate (on determination, it was found that each drachm apothecary [i.e., 3.9 g.] of this preparation contained about 0.039 mg. of copper), and it was considered possible that the beneficial effect of this preparation might be due to the catalytic action of the copper which it contained. On December 11, twenty of the piners were then segregated, and to eleven of these a preparation containing copper in a dose five times the amount in which it occurred as an impurity in the iron ammonium citrate was administered in solution. To the other nine pining sheep, iron ammonium citrate was administered as above described. No beneficial effect was observed in the "copper group" when this observation was discontinued five weeks later on January 15, 1936, whereas the group receiving the iron salt rapidly improved and completely recovered within a period of three weeks. Thereafter the "copper group" received the iron treatment, whereupon they made a gradual recovery.

No poikilocytosis or other morphological abnormality in the red cells was observed.

Examination for Helminths

There were also made a limited number of counts of the nematode eggs present in aliquot samples of precisely weighed quantities of fæces. It was found that, considering the number of eggs in the iron group as 1, the number in the piners was 17.25.

Discussion

It has been suggested by Stewart and Piercy[9] that pine is not caused by a mineral deficiency but is due to helminth invasion. These workers further suggest that the beneficial effects which follow the administration of minerals are due to their possessing anthelmintic properties. This view cannot be readily accepted. Iron ammonium citrate is a relatively bland preparation and is not known to possess any particular anthelmintic action, but even if it does produce an anthelmintic effect it is difficult to believe that such effect would continue to be exerted for a period of five months after its admini-

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stration had ceased in sheep continuously grazed upon what presumably was heavily infested pasture. Further the cytologic blood picture, as shown by Stewart and Piercy, is not such as is recognised to be associated with hæmonchosis. It is known that any condition of debility occurring in grazing animals is conducive to helminthiasis, but the occurrence of heavy worm infestations in pine should, we believe, be regarded as of only secondary importance.

An examination of the hæmoglobin figures in both the treated and the untreated sheep (Table I) shows a wide range in both groups, with considerable overlapping. It was further noted that although iron therapy proved effective in producing a cure, it was not always followed by an increase in the blood hæmoglobin. This observation was also made in the case of the Moredun Institute's experiments carried out in the Hebrides. It was generally observed, however, that when an affected animal had initially a low hæmoglobin content, iron therapy always increased the percentage of this constituent.

The disease of sheep in Australia known as enzootic marasmus bears resemblance to pine in its clinical manifestation and in its curative response to the administration of iron compounds. During the progress of these investigations it was shown by Underwood and Filmer [10] that enzootic marasmus could be cured by treatment with hydrochloric acid extracts of limonite ($Fe_2O_3.H_2O$), from which all the iron had been removed. Eventually the conclusion was reached that the disease was due to a deficiency of cobalt in the food. Subsequently Askew and Dixon in New Zealand [11] showed that Bush Sickness could be cured by the administration of cobalt salts, and that one sample of iron ammonium citrate which had proved beneficial contained 24 p.p.m. of cobalt.

As has been indicated, we could obtain no evidence in these experiments that copper acted as a catalyst in facilitating the absorption of iron. In view of the above evidence that cobalt plays an important rôle in animal nutrition, further investigation may show that its deficiency in pasture is associated with Border pine and other forms of nutritional anæmia in farm animals in Scotland.

It is recognised that the results recorded in this communication are incomplete, but they are considered to be of sufficient importance to warrant their publication, and to permit of the following tentative conclusions.

Summary

(1) There is evidence that the form of pine which occurs in the Cheviot area is an anæmia, chlorotic in type.

(2) The condition may be prevented and cured by the administration of iron and ammonium citrate.

REFERENCES
(1) Greig, J. Russell; Dryerre, H., *et al* (1933,): *Vet. J.*, *89*, 99.
(2) Godden, W., and Grimmett, R. E. R. (1928): *J. Agric. Sci.*, *18*, 363.
(3) Aston, B. C. (1924): *N. Zealand J. Agric.*, *28*, 215; *29*, 14.
(4) Orr, J. B. (London, 1929): "Minerals in Pasture."
(5) Neal, W. M., and Becker, R. B. (1933): *J. Agric. Res.* *46*, 557.
(6) Brown, J. (1935): *Vet. Record*, *15*, 1233.
(7) Hogg, J. (1831): *Quart. J. Agric.*, *2*, 697.
(8) McGowan, J. P., and Smith, W. G. (1922): *Scottish J. Agric.*, *5*, 274.
(9) Stewart, W. L., and Piercy, S. E. (1935): *J. comp. Path. Therap.*, *48*, 157.
(10) Underwood, E. J., and Filmer, J. F. (1935): *Aust. Vet. J.*, *11*, 84.
(11) Askew, H. O., and Dixon, J. K. (1936): Res. pub. No. 35, Cawthron Institute.

COMPARATIVE VALUE OF HOME-KILLED LAMB VERSUS IMPORTED LAMB

By Lt.-Col. DUNLOP YOUNG, O.B.E., D.V.S.M., M.R.C.V.S.

SOME time ago an interesting piece of work was carried out by the well-known firm of analysts and chemists, Messrs. Rideal, Rideal & Sciver, on the value of home-killed meat versus Argentine chilled meat. This created a very great deal of interest and led to a testing of home-killed lamb versus imported lamb. The main objects of the investigation were to establish in each case facts in relation to the following matters:

(1) The loss of weight of the joints in cooking.

(2) The proportion of bone to edible matter after cooking.

(3) The digestibility of the cooked meat (*in vitro*).

In addition a number of subsidiary matters were recorded, including the proportion of dripping, fat and essence. The meat for these tests was purchased in the open market by the writer, care being taken that as far as possible the joints were everyday average joints as exposed on Smithfield Market.

Mr. Sciver, B.S.c., F.I.C., the well-known expert on this subject, personally carried out the experiments and he described the method in which it was done.

By the courtesy of the Gas Light and Coke Company, there were fitted up in the laboratories two gas cookers (New World, No. 3). These two ovens were equalised by means of a thermo-couple and galvanometer in order to have the same cooking temperature. Both ovens were fitted by the widely used Regulo temperature control. The Gas Light and Coke Company very kindly loaned the services of one of their expert lady demonstrator cooks (Miss E. W. Lydall), who acted as an independent observer on almost all of the experiments.

Each joint was carefully weighed just before it was put in the oven,

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then cooked and allowed to cool, and weighed again. The collected dripping and gravy were also weighed separately. In the tables hereafter given the loss of weight of the joint, the weight of dripping and gravy have all been calculated as percentages of the uncooked joint. The weight of bone has been calculated as a percentage of the cooked joint.

The digestion experiments were carried out upon 10 grammes of the minced lean in 100 c.c. of distilled water containing 1 c.c. of 20 per cent. hydrochloric acid and 0.5 grammes of pepsin. This mixture was placed in an incubator at human blood heat (37.5 degrees C.) for four hours and then filtered. The undigested fibrin was then dried and weighed. The moisture in the original minced cooked lean was determined so that the undigested fibrin could be calculated as a percentage of the dried lean.

The mineral matter in the wet lean was determined by ashing the dried lean in platinum crucibles and weighing the mineral ash.

The results are tabulated below:

English Lamb Legs

	No. 1	*No.* 2	*No.* 3	*Average*
Weight of Joint	5 lbs. 10 oz.	4 lbs. 15½ oz.	5 lbs. 12½ oz.	5 lbs. 7 oz.
Loss of weight, per cent.	29.2	28.4	30.8	29.4
Essence, per cent.	6.4	4.0	3.5	4.6
Dripping, per cent.	6.6	6.2	7.0	6.6
Bones (percentage of cooked meat)	17.5	21.0	19.1	19.2
Moisture in cooked lean, per cent.	62.0	63.6	60.6	62.0
Mineral matter in wet cooked lean, per cent.	1.0	1.07	1.12	1.06
Undigested matter on dried lean, per cent.	11.8	8.8	9.1	9.9

"A" Lamb Legs

	No. 1	*No.* 2	*No.* 3
Weight of Joint	4 lbs. 7¾ oz.	4 lbs. 7¾ oz.	4 lbs. 14 oz.
Loss of weight, per cent.	26.1	25.7	33.9
Essence, per cent.	1.9	3.1	3.2
Dripping, per cent.	7.9	5.6	10.2
Bones (percentage of cooked meat) ...	14.6	17.4	10.8
Moisture in cooked lean, per cent. ...	64.2	61.3	61.0
Mineral matter in wet cooked lean, per cent.	1.1	1.12	1.025
Undigested matter on dried lean, per cent.	12.8	10.5	11.3

	No. 4	*No.* 5	*Average*
Weight of Joint	4 lbs. 13¾ oz.	5 lbs. 4 oz.	4 lbs. 12.6 oz.
Loss of weight, per cent.	33.6	30.0	29.7
Essence, per cent.	3.2	5.2	3.32
Dripping, per cent.	10.2	9.0	8.6
Bones (percentage of cooked meat) ...	10.8	11.6	13.06
Moisture in cooked lean, per cent. ...	58.7	62.4	61.5
Mineral matter in wet cooked lean, per cent.	1.10	1.10	1.09
Undigested matter on dried lean, per cent.	9.4	5.9	9.98

"B" Lamb Legs

	No. 1	*No.* 2
Weight of Joint	5 lbs. 0¼ oz.	4 lbs. 13½ oz.
Loss of weight, per cent.	28.4	33.9
Essence, per cent.	1.9	2.6
Dripping, per cent.	7.2	9.2
Bones (percentage of cooked meat)	20.9	20.0
Moisture in cooked lean, per cent.	63.7	64.3
Mineral matter in wet cooked lean, per cent. ...	1.0	1.12
Undigested matter on dried lean, per cent. ...	9.8	12.6

	No. 3	*No.* 4	*Average*
Weight of Joint	3 lbs. 12 oz.	3 lbs. 8¾ oz.	4 lbs. 4½ oz.
Loss of weight, per cent.	27.5	28.2	29.5
Essence, per cent.	2.8	1.9	2.3
Dripping, per cent.	7.5	5.7	7.6
Bones (percentage of cooked meat) ...	12.5	13.0	16.6
Moisture in cooked lean, per cent. ...	64.6	64.8	64.3
Mineral matter in wet cooked lean, per cent.	1.22	1.25	1.15
Undigested matter on dried lean, per cent.	8.1	7.3	9.45

"C" Lamb Legs

	No. 1	*No.* 2	*No.* 3	*Average*
Weight of Joint	4 lbs. 12 oz.	4 lbs. 12½ oz.	4 lbs. 15 oz.	4 lbs. 13 oz.
Loss of weight, per cent.	31.5	34.5	35.2	35.7
Essence, per cent.	2.3	2.4	2.5	2.4
Dripping, per cent.	8.5	10.2	10.1	9.6
Bones (percentage of cooked meat)	19.1	19.1	17.6	18.6
Moisture in cooked lean, per cent.	64.5	61.6	60.6	62.2
Mineral matter in wet cooked lean, per cent.	1.1	1.25	1.2	1.18
Undigested matter on dried lean, per cent.	8.0	9.5	10.7	9.4

A careful note has been made of the collective opinion with regard to eating properties of the comparatively large number of individuals who helped to consume these joints.

It was the unanimous opinion that the English meat was best, while the "A" meat was very nearly as good, the flavour and texture of the latter being only slightly less attractive than that of the English meat. The "B" and "C" lambs were inferior to the English and "A" lamb.

The more important facts arising from the experimental data detailed above may be tabulated as follows:

Legs of Lamb

	English	*"A"*	*"B"*	*"C"*
Loss of weight on cooking, per cent. ...	29.4	29.7	29.5	35.7
Percentage of bone to edible matter, after cooking	19.2	13.06	16.6	18.6
Undigested matter on dried lean, per cent. ...	9.9	9.98	9.45	9.4
Prices of lamb (per 8-lb. stone)	6s.	5s. 1d.	4s. 7d.	4s. 7d.

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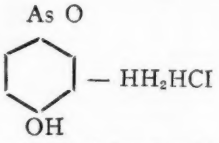
NEW ARSENICAL PREPARATIONS IN THE TREATMENT OF BLACKHEAD IN TURKEYS

By W. P. BLOUNT, F.R.C.V.S.
Lewes.

UNTIL quite recently the treatment of Blackhead in turkeys has been confined to the use of astringents and the so-called intestinal antiseptics such as catechu, sodium sulpho-carbolate, potassium permanganate, etc. During the past few years changes in management, i.e., the rearing of poults intensively, have been adopted in an effort to control the disease which still proves the source of great losses to farmers throughout the country. More recently still active treatment of the disease by injections of organic arsenic have been given with considerable success, although none have proved as specific and infallible as was at one time thought might prove to be the case. Intravenous injections of neo-solvarsan and allied organic preparations have proved of great value in the control of Blackhead, as has myo-solvarsan intramuscularly, and Spirocid (Bayer) orally. Indeed the latter would almost appear a better product for general farm use in that it is cheaper, can be administered by the poultry-keeper easily, and appears to be quite satisfactory both as a preventive or curative in the early stages.

The following extract from a letter from a local farmer shows that the treatment of Blackhead can be accomplished with satisfaction: "Last year I hatched 62 and actually killed 59 at Christmas. Their dead weight was 970½ lbs. (averaging 16 lbs. 7 ozs. each) and they brought me in £88 6s.—these birds no doubt paid me well. Several of them showed signs of Blackhead during the season and were promptly treated with Spirocid tablets, and all recovered and made good except three."

Other preparations such as Stabilarsan, Vet-stab, and Arsphenamine have been tried with varying success, but about a year ago a new product, Mapharside (Parke Davis), was used experimentally for the first time in Blackhead work. Containing 29 per cent. of arsenic in tri-valent form, Mapharside crystals had been found an effective spirochacticide for the treatment of syphilis in man. It is a comparatively stable homogeneous compound, does not become toxic while standing in solution, dissolves readily in fresh distilled or boiled water and is represented by the structural formula:—



Mapharside is claimed to be directly and immediately spirochacticidal and is given by intravenous or intramuscular injection. It is supplied in ampoules

(sealed in an atmosphere of nitrogen) together with a suitable quantity of alkali and sucrose and when dissolved in distilled water forms an isotonic solution. Ampoules contain .04 or .06 gramme symthetic meta-amino-para-hydroxy-phenylearsine-oxide hydrochloride (Mapharside) which is stated to contain the equivalent of 38.3 per cent. w/w of arsenic trioxide.

One of the greatest difficulties in assessing the value of any treatment for Blackhead is the fact that little if any knowledge is available concerning the extent of the disease process in birds at the time of injection. It cannot be assumed that because birds look sound they are disease-free, for there is little doubt clinical symptoms do not usually develop until very advanced lesions are present throughout the liver. This is especially so in older birds where fully 50 per cent. of the hepatic function would appear to be lost before any symptoms make their first appearance.

In the majority of cases the farmer awaits one or more deaths in his turkey flock before commencing curative treatment—only the enlightened few considering its preventive aspect. Indeed, in many instances such dead birds never undergo post-mortem examination and therefore on occasion confusion may exist due to the presence of coccidiosis. If therefore a flock is now injected little is known as to the extent of the disease among the birds, numbers unaffected, or infectivity of the ground. However, the end result is quite clear, for the farmer will say to himself: "I am in the habit of losing so many of my turkeys (presumably from Blackhead) each year; is this treatment going to reduce that number and, if so, will the cost permit its use on economic grounds?"

The following notes may be of interest:—

Case 1.

Fifty five-week-old American M. bronze turkey chicks (Lot A) were purchased June 1, 1937. Twenty died from rickets and blood-stained droppings—believed to be coccidiosis. Lot B consisted of 35 newly-hatched chicks and 15 day-old replacements from Lot A. Standard arsenical injections had been given to Lot A on June 15 without success; the farmer re-inoculated them again on August 1 when Lot B also received their first inoculation. Losses in Lot B had commenced and on September 16 when we were consulted the 21 remaining birds were given by us an initial injection of Mapharside—.004 grammes per bird. Post-mortem examinations had confirmed Blackhead with nephritis in a typically affected bird. A second dose was given eight days later (September 24) and although two birds died in the meantime, only one of these deaths was associated with Blackhead. After a third injection on October 8 the birds greatly improved and only one bird died between that date and November 8 when a fourth dose was given to the remaining birds in batches A and B—30 in all. In this instance therefore certain of the birds required four doses of Mapharside before being cured.

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Case 2.

Five birds out of 100 having died from Blackhead, the remaining 95 turkeys were inoculated with .006 grammes Mapharside in November, 1937. Only one bird was lost five days later (23/11/37) and this showed typical lesions.

Case 3.

On October 4, 60 turkey poults were inoculated with .004 gramme Mapharside and one month later after only two birds had died the remaining 58 were given a second injection, this time of the stronger concentration (.006 grammes). One other bird died on November 9; it was found to have died from Visceral Gout in association with Blackhead (the lesions of which were undergoing healing). Therefore on November 15 57 birds received a third injection .006 grammes Mapharside. A week later, 24/11/37, one other bird was found dead—the Blackhead being complicated by air sac pus formation.

Dosage and Toxicity

Experiments have shown that .004 grammes Mapharside is quite a safe dose for three-months-old poults, and that for older birds .006 grammes is convenient for routine dosage. 0.12 grammes does not appear to be toxic, but 0.15 grammes must be considered borderline as it will kill some birds and not others. Five times the normal dose, i.e., .03 grammes, proves fatal within an hour or two of injection.

Sequalæ

Occasional birds have shown signs of pain following the injection of Mapharside into the leg muscles. (Normally the breast site is chosen, but in emaciated birds there is usually more flesh on the legs!)

This, however, is probably due to the fact that for poultry work the writer has diluted the contents of each ampoule with only one c.c. of distilled (boiled) water and not with 10 c.c. (as advocated by the manufacturers for isotonic purposes). One c.c. is a convenient quantity to use, for then each bird only requires to receive 1/10th c.c. in the muscles. Therefore it is probable that the use of two or even five c.c. of diluting fluid would eliminate any question of pain, but in our experience it occurs relatively infrequently and passes off quite rapidly so that little attention has been paid to it.

The Healing Process

As indicated in a short clinical article which appeared in last month's issue of THE VETERINARY JOURNAL, one interesting feature of these Mapharside injections has been the production of lymphomatous-like tumours which replace the typical Blackhead lesion during the process of healing. Infiltration with lymphoidal cells occurs, but it is hoped to study this process more fully during the coming season.

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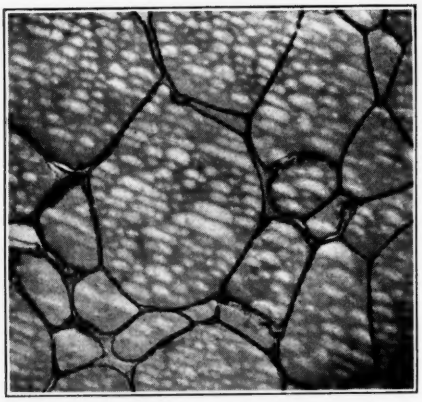

FIG. 1.—H. & E. x 65.

THYROID OF CASE 1: LARGE IRREGULAR ACINI LINED BY FLATTENED EPITHELIUM.

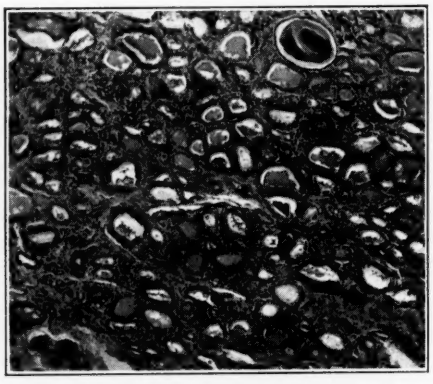

FIG. 2.—H. & E. x 65.

A HYPERPLASTIC PORTION OF THE THYROID FROM CASE 2.

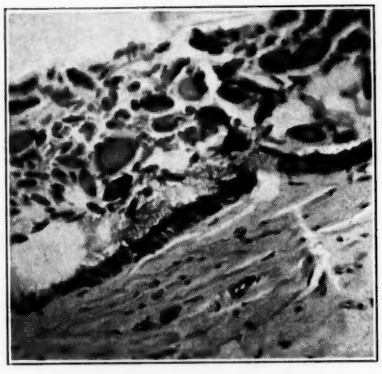

FIG. 3.—H. & E. x 360.

TRANSITIONAL EPITHELIUM LINING A THYREOGLOSSAL CYST, THE CONTENTS OF WHICH ARE SEEN IN THE UPPER HALF OF THE PICTURE. CASE 2.

ARTICLE BY CAPT. V. BERWYN JONES, M.R.C.V.S. PAGE 347.

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Individual Treatment

It is frequently stated that individual treatment for poultry is uneconomical, but the following case disproves this.

A young turkey stag, thin and confidently believed to be suffering from Blackhead (typical symptoms and from an infected flock) received on October 4 .004 grammes Mapharside; its weight at this stage was 6 lbs. 2 ozs. One month later (5/11/37) its weight had increased by over 1 lb. per week, i.e., to 10 lbs. 4 ozs. As a precautionary measure a further dose of the arsenic was given .006 grammes Mapharside and the bird continued to increase in weight until Christmas time when it was killed for market.

Summary and Conclusions

Spirocid (Bayer) oral tablets and Mapharside (Parke Davis) intramuscular injections both appear to be of real value in the control of Blackhead in turkeys.

The following dosages appear satisfactory:—

Spirocid.—Age 3-6 weeks, half tablet repeated at weekly intervals.
6 weeks upwards, one tablet every ten days as required.

Mapharside.—Age 3 months, .004 grammes.
5 months, .006 grammes.

To be repeated at one, two or four weeks' interval, according to requirements.

(*Note.*—Each ampoule is sufficient for ten birds, and if the contents are not all used any surplus should be discarded. The syringe should be sterilised with boiling water and then the Mapharside crystals finally dissolved in hot boiled water.)

NAVICULAR DISEASE

By V. BERWYN JONES, M.R.C.V.S.
Wonersh, Guildford.

FOLLOWING my paper (THE VETERINARY JOURNAL, Vol. 92, No. 9, page 325), suggesting that the parathyroids might have some influence on generalised bone disease in equines, I was able to obtain three cases for operation that showed clinical evidence of enlarged unilateral thyroids.

Case (1). A two-year-old thoroughbred filly (Orange Light). — This animal had been put into training but was inclined to be sluggish, " did not put it in " and did not train on. It was then observed that she was getting very " jointy " (i.e., enlarged fetlock joints) and the owner allowed me to remove a very enlarged thyroid.

Three weeks after operation a distinct change in temperament and a considerable lessening of the joint enlargements was observed. It must, however, be remarked that the enforced rest was probably a contributory factor,

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and it will be necessary to wait another year (until next season) before any useful deductions may be made in this case.

Case (2). A T, B, four-year-old (Blackford).—This gelding had been in training for the past season, but had never been sound and could never be properly "wound up"; when his preparation was nearly complete he became cripple lame in both fore—particularly the OF. X-ray showed well-marked navicular disease of the osteoblastic type. A very enlarged thyroid was removed.

In all these cases it was my intention to remove the parathyroids, together with the cystic thyroid, but, although the thyroidectomy does not present any very great surgical difficulty, in no case was it found possible to locate the parathyroids.

Several post-mortem examinations and dissections of the area had led me to adopt the supposition that usually two are present, one in the fascial tissue on the deep face of the thyroid and rather superior to the gland, and the other a little distant (one to 1½ inches) from the anterior pole. These glands, however, are so hidden and are so nearly of the same colour and consistence as the surrounding tissues (even when carefully dissected free they are but faintly yellowish grey and but little larger than a flattened marrowfat pea) that it was not found possible to locate them at operation. I had therefore to content myself with observing the effect of the thyroidectomies *per se*.

This case (2) was not improved immediately after operation and has been out at grass since. At this date, three months after operation, he is clinically sound, trotting level and freely. I propose to have him up in a month's time to radiograph. He will then be put into work to see if he remains sound.

Both this case (2) and the following case (3) were so crippled that they were to have gone to the knackers but for my intervention and desire to keep them for operation.

Case (3) was a nine-year-old polo pony (Murray's) with a particularly well-marked navicular caries that had no radiographic evidence of any osteophitic activity, i.e., an osteoclastic type. This pony had no papable goitre. It was therefore decided to remove the thyroid from the same side as the lame leg.

Again the parathyroids could not be located and a cystic thyroid was removed. This animal trotted level the following day and the action is maintained unless he is cantered, when lameness recurs. Both the improvement and the recurrence of lameness are difficult to explain, more especially as no change can be observed in the radiographs, one of which has been taken each month for six months since operation.

It is observed, in all cases, that the general condition has greatly improved, and that the animals are more bright and alert in demeanour. The history of these cases demonstrates that thyroidectomy may not only be performed

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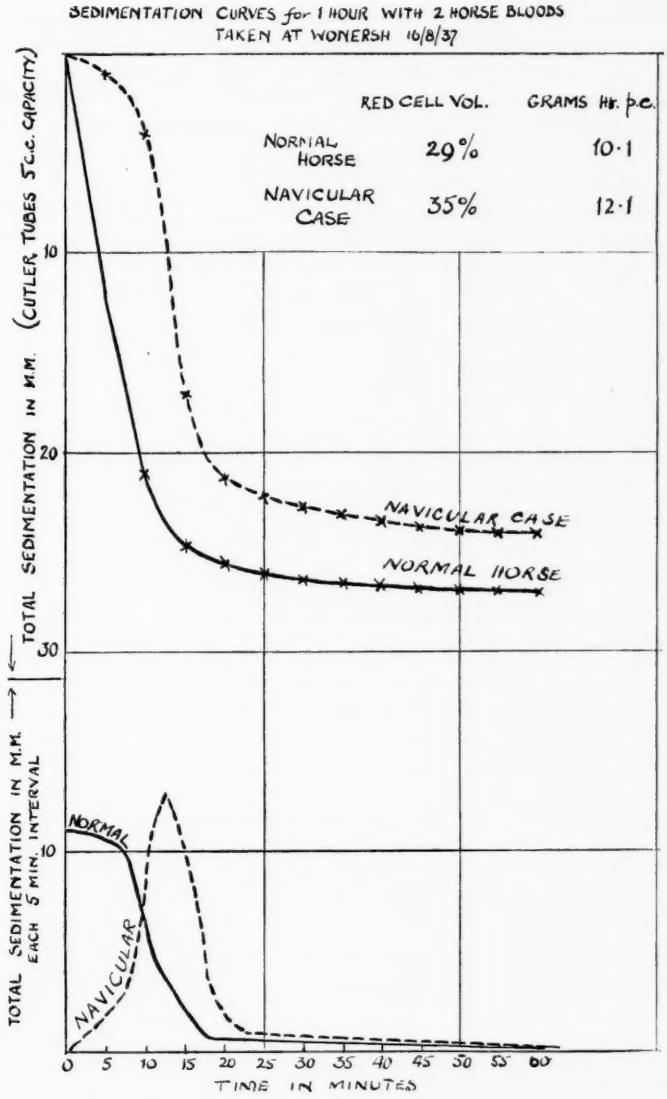

ARTICLE BY V. BERWYN JONES, M.R.C.V.S. PAGE 347.

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with impunity, but with marked benefit in those equine cases that have an obviously enlarged unilateral thyroid.

Although the enlargement is probably usually due to a so-called simple colloid goitre, which latter is not considered, in human medicine, to have any clinical significance, there can be no question that the presence in the body of a gland of an abnormal structure and secretion is unlikely to be without effect on the general metabolic processes. This consideration, as has been stated, is strengthened by clinical observation.

The interest of Case (3) is perhaps greater, in that there was no clinical evidence of a diseased thyroid, and it was not suspected to be abnormal. This case in particular, taken together with the others, raises the most interesting question, whether the thyroid does play any part in, or has any influence on, the equine osteo-dystrophies.

Although I have shown that there appears to be two types of navicular disease (see *Vet. Record*, Vol. 50, No. 30), and that at a later stage of the disease such types sometimes, but not always, merge, it is still interesting to consider whether the one or the other or both types together are a manifestation of a metabolic disorder.

The osteoblastic type that shows only a new deposit of bone around the periphery of the navicular is, in my experience, always associated with other pathological depositions. One will always find arthrites or splints or sidebones or ringbones co-incident with the above type. Whereas the pure osteoclastic type is suggestive macroscopically of a simple local necrosis.

Normal Thyroid Gland

According to Sisson's Anatomy the average size is 5 x 2.5 x 2 cm. (each lobe) and the average weight 15 gm. (each lobe).

The amount of colloid seen histologically varies considerably; in general, a large amount of colloid denotes inactivity and vice versa. The iodine content of the gland is accepted as the most important guide to normality.

Case 2. (My ref. D.S. 41/37.)

Subject.—Thoroughbred gelding, "Blackford," four-year-old. Right lobe of thyroid surgically removed.

Macroscopic.—Approximately 8 x 5 x 5 cm., covered by tense capsule. On section appeared homogeneous, with large and irregular follicles. No parathyroid tissue seen.

Microscopic.—A condition of diffuse colloid goitre with large irregular acini, very flattened epithelium and scanty supporting connective tissue. See Fig. 1.

Case 4. (My ref. D.S. 68/37.)

Subject.—A navicular case examined post-mortem at Peasemarsh.

Macroscopic.—Both lobes normal appearance, average size 4.5 x 2.5 x 1.5 cm. Homogeneous finely vesicular cut surface. Two embedded parathyroids present, which appeared to be intimately connected with some adjacent finely cystic tissue.

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Microscopic.—To the naked eye the tissue looked normal, and the majority of sections made gave the picture of a normal actively secreting gland. In parts, however, there was hyperplasia and the epithelium varied from the flattened type to high cubical or columnar. These areas showed an excessive amount of fibrous tissue. See Fig. 2. In the tissues immediately surrounding the embedded parathyroids numerous irregular cysts were present, containing a granular, non-nucleated homogeneous looking debris, and the cysts and contiguous thyroid and parathyroid tissues were surrounded and invaded by a considerable amount of fibrous tissue. The epithelium lining the cysts was for the most part composed of single ciliated cells, but in some of the cavities the lining was transitional epithelium three or four cells deep. See Fig. 3. These cysts are probably embryological relics, thyreoglossal cysts that have developed from the unabsorbed thyreoglossal duct.

Case 3. (My ref. D.S. 70/37.)

Subject.—Nine-year-old polo pony (Murray's), with navicular disease. Left lobe of thyroid surgically removed.

Macroscopic.—Fairly normal appearance, approximately 5 x 3 x 2.5 cm., weight 15.2 gm. On section the vesicles seemed fairly large.

Microscopic.—Picture of an inactive thyroid with irregular shaped acini of various sizes lined by flattened epithelium. The colloid material in many acini stained deeply with eosin. No parathyroid tissue seen.

Case 1. (My ref. D.S. 71/37.)

Subject.—Thoroughbred filly, three-year-old (Orange Light). Right lobe of thyroid surgically removed.

Macroscopic.—Very large thyroid lobe, 7.5 x 4.5 x 5 cm., weighing 72.5 gm., covered by tense capsule. The cut surface had a homogeneous appearance with easily visible large acini.

Microscopic.—A diffuse colloid goitre with irregular acini of various sizes. The epithelium was not so flattened, being low cubical. Nor were such large acini seen. No parathyroid tissue could be found.

Summary

Case 1.

Colloid goitre.

Case 2.

Normal and hyperplastic thyroid tissue with persistent thyreoglossal duct and cyst formation.

Case 3.

Inactive thyroid gland, normal size.

Case 4.

Colloid goitre.

Microphotographs and Reports by the Department of Pathology, Ministry of Agriculture, Weybridge.

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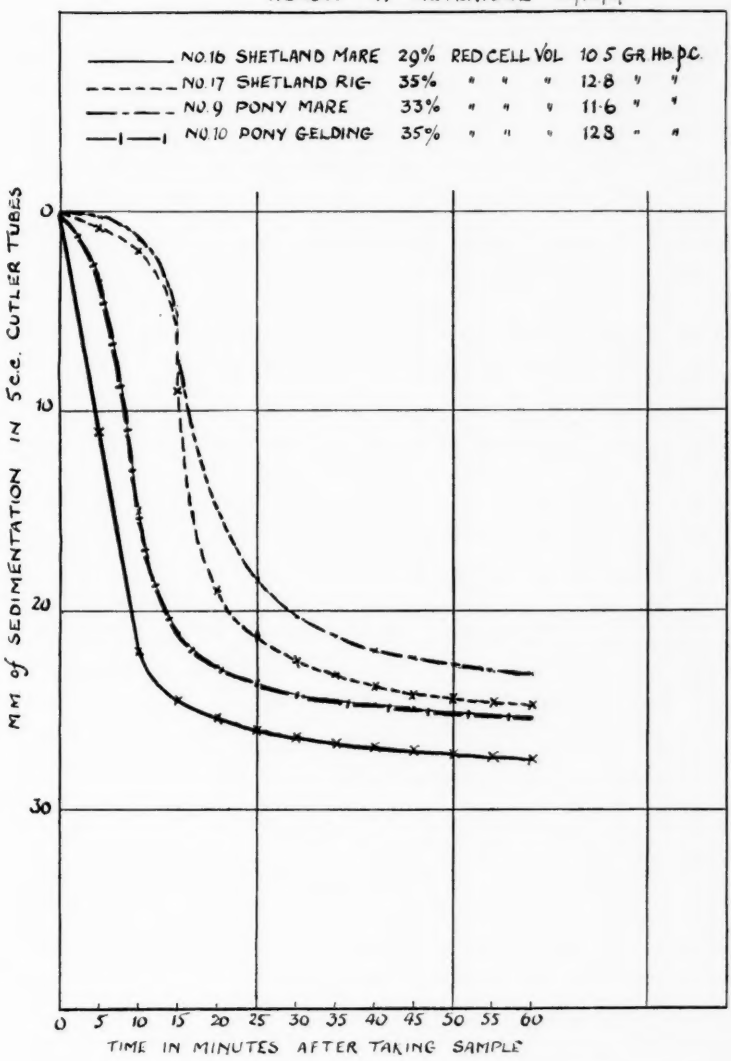
SEDIMENTATION CURVES ON 4 APPARENTLY NORMAL HORSES AT WEYBRIDGE 12/10/37


NO.16 SHETLAND MARE 29% RED CELL VOL 10·5 GR Hb. p.c.
NO.17 SHETLAND RIG 35% " " " 12·8 " "
NO.9 PONY MARE 33% " " " 11·6 " "
NO.10 PONY GELDING 35% " " " 12·8 " "
MM of SEDIMENTATION IN 5c.c. CUTLER TUBES
0
10
20
30
0 5 10 15 20 25 30 35 40 45 50 55 60
TIME IN MINUTES AFTER TAKING SAMPLE

ARTICLE BY V. BERWYN JONES, M.R.C.V.S. PAGE 347.

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It seems probable that Mitchell is on the right track in that he has formulated the theory that most, if not all, of these equine osteo-dystrophies are but local manifestations of a generalised disease process.

As long ago as 1936 I took a number of blood samples from a variety of horses in an attempt to obtain some figures, from biochemical analyses, that might be looked upon as the normal figures obtained from the normal sound horse (no such analyses had been published before this work was undertaken). It was also hoped that the analyses of the unsound horses would reveal differences in some particulars and perhaps furnish an explanation for these dystrophies. However, the figures appear so varied that it does not seem possible to differentiate the normal from the abnormal.

13 Racehorses in Training at Coverwood House, Ewhurst, Surrey, Owned and Trained by M. D. Blair, Esq.

Bled September 4, 1936.

No.	Name	Age	Serum Ca.	Serum Mg.	Serum Phospha-tase	Blood Sugar	Inorganic Phos-phorous	Hæmo-globin
1	Kencapelle	6	13.0	1.83	12.9	58	1.94	13.0
2	Prince Memnon*	2	12.7	1.98	24.7	63	2.13	13.3
3	Silver Point	6	12.5	2.18	15.2	68	1.75	15.3
4	Mirage	4	12.7	2.07	16.4	60	2.16	13.6
5	Chestnut 2-year-old†	2	12.8	1.76	26.9	79	2.42	11.2
6	Cartoonist	3	12.6	2.27	17.5	76	2.46	11.2
7	The Bear	6	12.7	1.82	17.4	69	2.08	13.3
8	Smike	3	13.0	2.08	14.2	69	2.20	12.7
9	Alarum†	2	12.3	2.14	20.2	70	2.24	13.0
10	Three Card Monty†	2	12.5	2.05	22.4	66	2.33	13.9
11	Aseptic	3	12.8	2.06	20.4	65	2.03	13.3
12	Empyrean	6	12.4	1.96	21.4	67	1.95	14.3
13	My Kingdom	4	12.3	1.92	17.7	65	2.10	13.4
	Maximum value		13.0	2.27	26.9	79	2.46	15.3
	Minimum value		12.3	1.76	12.9	58	1.75	11.2
	Average value		12.6	2.01	19.0	67	2.14	13.2

*Very jointy. †Sore shins.

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BIOCHEMICAL LABORATORY REPORT.

Blood Samples taken by Mr. Berwyn Jones, M.R.C.V.S., Wonersh, 2/9/36.

No.	Name	Colour	Age	Breeding	Serum Ca.	Serum Mg.	Serum Phosphatase	Blood Sugar	Inorganic Phosphorous	Hæmoglobin	Remarks
1	Jane m.	Grey	9	¾ bred	12.4	1.75	18.5	88	2.68	10.0	—
2	Jemima m.	Br.	11	Pony	12.4	1.96	12.1	82	2.25	10.8	Wind sucker
3	Jessica m.	Ch.	8	Straight	11.7	1.31	27.3	83	2.12	9.4	Convalescent after strangles
4	Eliza m.	Dun	9	¾ bred	11.8	1.90	18.8	78	2.48	10.2	—
5	Fusillade g.	Bay	9	H.S.B.	12.0	1.70	35.1	—	—	—	Splints both fore
6	Major g.	Bay	7	½ bred	12.2	1.73	18.1	63	2.70	11.1	—
7	Beaucair g.	Bay	14	Thoroughbred	11.9	1.46	22.1	71	3.64	10.0	Laryngeal op. 5 weeks ago
8	Star Act g.	Br.	3	Thoroughbred	12.2	1.50	27.9	64	3.96	11.0	—
9	Nutmeg m.	Roan	7	¾ bred	11.6	1.41	18.9	63	3.10	11.9	—
10	Fidgets m.	Ch.	7	¾ bred	12.4	1.22	17.1	74	2.23	11.3	—
11	Sam g.	Br.	9	½ bred	12.1	1.84	17.7	78	2.54	10.1	—
12	Marquis g.	Ch.	8	⅞ bred	11.9	1.78	17.2	55	2.59	9.1	Recovering from "under-run" sole
				Maximum	12.4	1.96	35.1	88	3.96	11.9	
				Minimum	11.6	1.22	12.1	55	2.12	9.1	
				Average	12.0	1.63	20.9	72	2.75	10.4	

BIOCHEMICAL LABORATORY REPORT.

Data on Horse Bloods Drawn by Major Pryer on 1/1/37.

No.	Remarks	Mgs. per 100 c.c.				Grams per 100 c.c.	Units per 100 c.c.
		Serum Ca.	Serum Mg.	Blood Sugar	Blood Inorganic P.	Blood Hæmoglobin	Serum Phosphatase
P.1	Paraplyia	12.6	2.0	66	3.2	13.4	16.1
P.2	Paraplyia and Ringbone	12.9	2.0	77	2.7	13.2	15.2
P.3	Ringbone	12.6	2.0	66	2.4	12.0	12.6
P.4	Navicular Disease	12.4	2.0	91	2.2	13.1	11.8
P.5	Spavin	12.8	1.8	71	2.0	12.0	13.3
P.6	Arthritis hip and navicular disease	13.5	2.1	68	2.2	15.3	14.1
P.7	Ringbone	12.9	2.0	70	1.8	12.0	10.8
P.8	Spavin	11.6	2.0	70	2.6	13.6	13.0
P.9	Pedal ostitis	11.1	2.3	82	2.5	14.3	11.7
P.10	Navicular ostitis	11.9	2.0	86	2.1	14.5	12.0
P.11	Controls showing no apparent bone disorder	12.6	2.0	63	2.7	13.1	12.9
P.12		12.7	2.2	57	2.1	15.6	15.3
P.13		13.0	2.0	61	2.2	12.1	11.1
P.14		12.3	2.1	63	2.4	15.0	9.1
P.15		13.0	2.1	61	2.2	13.0	8.9
P.16		12.2	2.1	58	2.4	16.8	13.1
P.17		12.9	2.0	66	2.2	11.1	16.3

Data of the Department of Biochemistry, Ministry of Agriculture, Weybridge.

Similarly, a biophysical examination of the sedimentation rate of equine blood in normal and diseased horses, although it appeared full of promise at the first attempt (see Graph I), has not given any except negative assistance in the elucidation of this problem.

The theory that navicular disease might be due to some local circulatory disturbance I have already disposed of in my paper to *The Veterinary Record*, Vol. 50, No. 23. In this paper it was conclusively demonstrated, by means of arteriograms of the digital vessels of normal and diseased horses, that although the blood flow in one of the more important arteries may be non-existent, the occlusion is not confined to animals that have

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macroscopic evidence of navicular disease. What is the nature of the occlusion, and whether evidence of navicular disease may be obtained microscopically, or whether the disease may arise at a subsequent date, remains to be worked out. I feel that all this matter, which has involved a not inconsiderable amount of labour and private expenditure, should be made available to the profession, because not only has some of it a negative value, but my somewhat disheartening efforts may conceivably have the effect of awakening a new theory, or line of research.

Clinical Articles

A FRACTURED PASTERN

By P. Z. MacKENZIE, M.R.C.V.S.
The Royal Veterinary College, London.

THE following case is recorded in order to show how an apparently slight injury may cause a very severe lesion.

The subject was a three-quarter bred chestnut mare aged about eight years. She was out at grass and, having been startled, ran across the field. She made a misstep, on what was apparently very good going, and pulled up dead lame in the off fore leg. On examination it was obvious that the pastern was fractured, the X-ray photographs showing the serious extent of the injury, and the mare was destroyed.

I am indebted to Mr. H. Ede for these photographs which he kindly took of the injured leg at post-mortem.

TUMOUR FORMATIONS IN THE VAGINA OF A MARE, REMOVAL

By R. HUDSON, F.R.C.V.S.
Retford.

THE subject was a Shire mare about ten years old. She had been a regular breeder every two years, one of the sort which will not conceive while suckling.

This spring she foaled and cleansed normally, and a few hours after

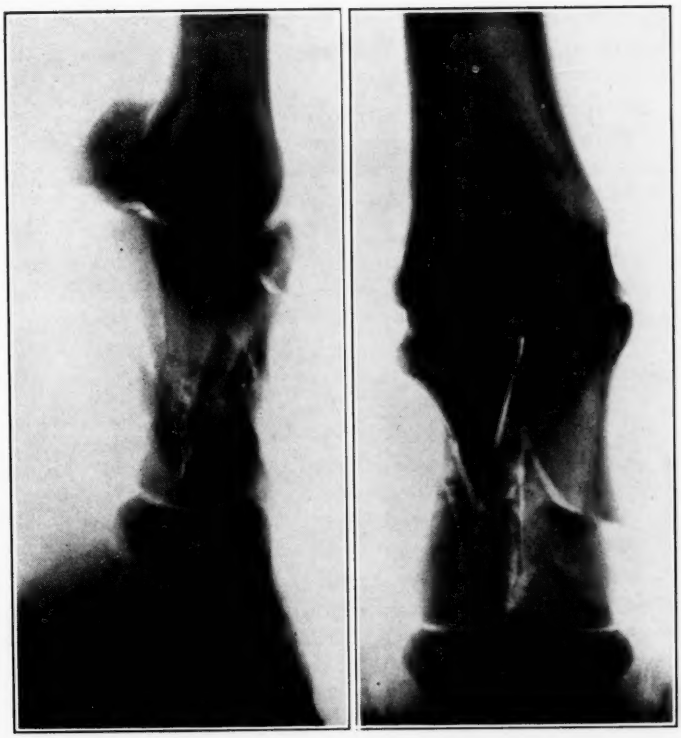

FIG. 1. FIG. 2.

ARTICLE BY P. Z. MACKENZIE, M.R.C.V.S. PAGE 354.

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the owner found a large tumour projecting from the vulva. He washed and replaced it himself, but in a short time found it out again and called me in.

I found a vascular mass protruding about the size of a football which, after washing and dressing with carbolic oil, was easily placed in the vagina, and when in that position it was found to be a circular fringe of growths following the situation of the hymen and from the remains of which it had no doubt developed. Some of the growths would be as large as my fist and all were joined in ring formation to a thickened base at the vaginal wall.

It was evident that the growths had reached such a size that they would have to be removed, but for obvious reasons it was necessary to wait a few days. I also thought that as the increased vascularity of parturition subsided the growths would diminish in size if the mass could be kept in the vagina.

The owner was instructed how to replace it and I saw her every two or three days. Sometimes it remained in all the day, at others it would be out three or four times, until, in about a week, he failed to return it, owing to the vulva and vagina contracting.

Operation

The mass was divided with scissors on each side up to the wall of the vagina, then a ligature of strong cord was placed round the base of the upper half, taking it round two or three times before knotting. In a similar way the lower half was ligatured, taking care to keep out the opening of the urethra.

I could just pass my hand through the centre into the vagina, but I could not replace the growth, so left it out. Three days later I removed the ligatures and took off the two halves of the mass separately with the ecraseur, swabbed out the vagina with boracic and iodoform in solution, and continued to do so every two or three days.

About a fortnight later, on examining her it was difficult to find a trace of thickening in the vaginal wall.

Tumours of the vagina are not uncommon in cows and mares, and develop usually as polypi from a fragment of the hymen. They are easily removed with the knife ecraseur, or, if the pedicle is of some thickness and it can be drawn out through the vulva, they are better removed with hot iron, cauterisation lessening the risk of further growth.

The reason for the application of ligatures in this case was to reduce the area of the wound after removal, and reduce the risk of breaking through into the abdomen.

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ŒDEMA OF THE DIGESTIVE ORGANS IN YOUNG PIGS

By R. HUDSON, F.R.C.V.S.
Retford.

THIS condition, described by Mr. Shanks in *The Veterinary Record*, March 19, 1938, has occurred several times lately. In one case five out of twelve pigs died within twenty-four hours. Then five more during the next two days and two, the smallest in the litter, lived.

In another case there were two dead and six alive. A day or two after there were four more dead and two alive and these two lived.

All were young pigs recently weaned and fed on too rich a food. The first lot were fed on new milk and sharps which they had received for about a fortnight. They were then allowed to graze about the stackyard when the trouble began. The second lot had a balanced ration which is often the case, but I have also noticed it after feeding on wheat meal.

The Symptoms

Pigs found dead, others on the floor unable to rise, kicking and struggling when approached, paralysis of the fore limbs, others wandering about as though drunk, falling over. When down they appear hypersensitive, but this may be because they cannot get away.

The post-mortem examination when made soon after death and in the first pigs to die shows a remarkable œdema throughout the digestive track.

The stomach, usually full of food, shows thickening of the wall by a watery exudate. Sometimes the mucous membrane may appear inflamed, but this is due to congestion of the muscular coat seen through the mucous membrane.

The small and large intestines are similarly infiltrated, often to such an extent as to prevent their collapse when cut across.

The mesentery binding the large intestine looks like clear jelly. The pericardium contains a watery fluid and the auricles often show œdema.

If the post-mortem has been made some hours after death much or all of the fluid in the intestinal wall finds its way into the abdomen, and in pigs which have survived a day or two this may also occur as well as secondary lesions. These may be local inflammations of the intestine throughout the wall or only of the mucous membrane, which sometimes shows a deposit easily removed.

In the early post-mortem no change is noticed in the mesenteric glands, but in the later ones they become congested and there is blood exudation along their track.

When there are a number of pigs the condition is easily diagnosed, but

when there are only two or three and the post-mortem has been delayed it is not so easy.

The condition is the cause of a heavy mortality in young pigs and will probably continue to increase so long as owners are advised to force them on rich foods from the time of weaning.

Translations

IMMUNOLOGY OF CATARACT IN MAN AND ANIMAL

By M. DEMONT
Veterinary Surgeon of Nice.

An article that won the Trasbot Prize.

Bulletin de l'Academie Vétérinaire de France, April, 1938.

THE malady was known in remote ages and the Hebrews confused it with other ocular affections like glaucoma, and the Egyptians gave it a name which we translate as "cataract" and which denotes in their language as well as ours fluvial cascades as well as the fall of "the opaque humour" on the crystalline lens. Scientific history of the affection begins really much later and it was in 1705 that Brisseau demonstrated at the Academy of Sciences of Paris that in all the cases of cataract that he has observed, he has always found an opaque crystalline lens. Doctor Demont, studying the causes of the malady, classes them as follows:—

1. Congenital cataracts which appear on the average in the proportion of 4.2 per cent. exist as well in the dog, the horse, the pig and the ox, whose real causes are unknown but where heredity appears to play an important rôle.

2. Acquired cataracts which are subdivided into three groups, juvenile cataracts and those of adult age, presenile and senile cataracts.

(a) Juvenile cataracts and those of adult age result from local, secondary and general causes.

The first are almost all due to traumatisms; these traumatisms do not result simply from contusions on the cornea, but can be deep-toned (crystalline lesions in the rabbit by prolonged applications of a diapason in the movement on the ocular globe) occasioned by infra-red caloric radiations, the luminous radiations of the solar spectrum, invisible ultra-violet radiations, industrial and atmospheric electricity, X-rays, the penetrating rays of radium—all these traumatic factors directly provoke the necessary cytolysis in the formation of the cataract. The most important secondary causes are all the infections or

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simply ocular inflammations. They proceed from the anterior segment of the eye (keratites and iritis) and from the posterior segment (lesions of the ciliary body, uvea and vitreous humour, uncementing of the retina). In animals, the horse in particular, these secondary infectious cataracts are frequent and often complicate not only iridian and ciliary hæmorrhages but iridocyclites, of which, according to certain authors, they constitute the only symptom apparent.

Besides these there are true infectious cataracts with microbian relations even in the parenchyma of the crystalline lens.

Finally, parasitic cataracts, quite exceptional in man but frequent in fish, especially perch and roach, and due to larvæ of a variety of Diplostomum, the mysosporidiæ of this protozoon seem to electively fix their domicile in the crystalline lens of the animal and make it blind.

The general causes may be associated with a disturbance of metabolism (rickets, diabetes, absence of vitamins, arthritis, rheumatism) or disurbances of endocrine origin (ovarian, pancreatic or thyroidean or other insufficiency).

(b) Presenile cataracts endocrine, or essential, these latter only exist in 4.2 per cent. of cases.

(c) Essential senile cataracts without apparent cause which constitute in man two-thirds of the affections of the crystalline lens. The group of these cataracts comprise cataracts associated with a general affection, atheromatous lesions of the heart and of the great vessels, nephritis, diabetes or senile glycosuria, the cataracts associated with a local affection, to a malady of the eye.

The stating of these causes show that the great majority of cataracts do not appear to answer to any clearly determined precise pathogeny.

The author now states the very numerous theories which have been announced to explain the problem of the origin of cataracts.

I—Anatomo-pathologic Theories

These are the oldest theories and they envisage the modifications generally met with in cataract. They are as follows:

Atrophy of certain fibres such as cellular disintegration (cytolysis);

appearance of liquid in the cellular interstices;

abundant proliferation of the cells of the anterior capsule of the crystalline lens—this modification may be due to a defensive reaction in the ailing tissue.

II—Biochemic Theories

(a) Theory of sclerosis of the crystalline lens, allowing a sclerous infiltration of the organ now nearly abandoned since it is demonstrated that cataracted crystallines enclose more water than normal crystallines of the same age.

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(b) Theory of hydration of the crystalline which corresponds in fact to an œdema of the crystalline.

(c) Theory of increase of the capsular permeability which is not universally admitted.

(d) Theory of hydrolysis which will be the chemical manifestation of an undoubted cytolysis and which is admitted by the majority of authors.

(e) Autolytic theory making the cataract a kind of aseptic gangrene of the crystalline.

III—Immunologic Theories

(a) Cytotoxic theory based on this fact of experience that the human crystalline is an excellent fixer of toxins, that it can in consequence fix different toxic poisons of the system and submit to their influence.

(b) Exotoxic theory.—Toxins which invade the crystalline and fix themselves there have not only a local cellular endogenic origin, but also other origins such as local cytolysis due to a physical agent like the most varied microbian poisons emanating from a bad functioning of the kidney, liver, intestine, etc. But this theory does not explain all the cases of the malady and particularly heredity, experimental cataracts by inoculation and also transmissibility of cataract by successive passages in animals..

Only the *bacteriological theory* is capable of explaining it and it is this conception that the author comes to in making known the results of his personal researches which allows that the toxin producers of disorders of the crystalline lenses are in the majority of cases of microbian origin, and that among the numerous families of germs which will be susceptible of most frequently attacking the crystalline, the enterococcus of Thiercelin and its related families seem the most specialised organisms concerned and those which most easily provoke experimental cataract. Lavagna, who has particularly studied the cataract of man, comes to the same conclusions that cataract in the immense majority of cases appears to be an infectious accident due to certain enterococci, a kind of entero-ocular syndrome, or more exactly an entero-lenticular syndrome.

From this theory ensues logically a treatment by an enterococcic antigenotherapy which the author has tested and which has given him encouraging results.

In support of his thesis Doctor Demont cites two observations on the dog; a first case of bilateral presenile cataract and another of bilateral senile cataract have been considerably benefited by a local treatment with an enterococcic base and by subcutaneous injections of the same antigen.

Doctor Demont concludes by explaining that his aim in publishing his thesis is to make known to the veterinary world a new treatment of an affection actually considered as incurable by known therapeutic means.

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THE ACTIVE IMMUNISATION OF CATTLE AGAINST FOOT-AND-MOUTH DISEASE

By O. WALDMANN and K. KOBE
(*Berl. Tierärztl. Wschr.* 1938, 22, 317.)

and DR. STRODTHOFF
(*Berl. Tierärztl. Wschr.* 1938. 24, 349.)

THE two articles describe the results of recent researches in Germany into the active immunisation of cattle against foot-and-mouth disease. In the first article is given a description of the work carried out at the laboratory on the Island of Reims by Waldmann and Köbe. The problem of the active immunisation has engaged the attention of the workers at that centre for the past fifteen years, but till 1935 little of a practical nature had been evolved. Experiments with foot-and-mouth disease virus attenuated by formalin had been carried out on about 2,000 guinea-pigs and 300 cattle, and the results obtained were: (1) guinea-pigs could be immunised with this vaccine without any harmful results and with regularity; (2) there was some evidence that cattle also could be protected; and (3) the virus present in the vaccine must be so altered so that although it must be non-infective for animals it must retain its antigenic value.

Work now was carried out with attenuated virus which had been adsorbed. It had been shown by workers in other countries that the use of toxins and viruses adsorbed by aluminium hydroxide as vaccines was followed by good results. The Danish workers, Schmidt and his collaborators, experimented on these lines with the virus of foot-and-mouth disease and were able to protect guinea-pigs. It was found that if the virus was heated or rendered avirulent the results were much inferior. On the Island of Reims, Jakobzek had also carried out experiments with the same type of vaccine and showed that 68 per cent. of treated guinea-pigs became partially immune, but that in a number of animals a generalised infection occurred. The Danish workers also experimented with cattle. They treated two calves and a cow with large doses of adsorbed virus obtained from guinea-pigs, but failed to produce good immunity. Toussieng also used a similar vaccine on cattle but he found that the treated animals either became infected following the injection of the vaccine or failed to stand up to infection later. Waldmann and Köbe carried out some work with the same type of vaccine but found that the vaccine conveyed infection to injected cattle.

The authors then studied the problem further, and by adopting certain "chemical and physical methods" of attenuating the virus after adsorption, it appears that the virus is so weakened that it fails to infect cattle when injected into them but retains its antigenic properties.

In the article is given a short description of the method of preparation of the vaccine. All the work has been done on cattle. The virus is obtained

from the tongues of cattle infected by scarification 24 hours previously and filtration of the lymph is carried out. The virus is now adsorbed on to aluminium hydroxide, the source of the chemical being, in the first instance, Denmark but for later work supplies have been obtained from chemical works in Germany. Both supplies acted equally well. After the virus has been adsorbed, it is still highly infective for cattle. The adsorbed virus is now submitted to the special " chemical and physical " method of attenuation. (The method is not described in the article.) The resultant product is the vaccine. Type A virus has been the material with which the various experiments have been carried out. The batches of vaccine are shown to be non-infective by being injected subcutaneously in large doses into susceptible cattle and by being rubbed into the scarified tongue of the same cattle. In addition to proving the non-infectivity of the virus for cattle, as far as foot-and-mouth disease is concerned, these tests also show that neither a local nor a general systemic reaction follows the use of the vaccine. Sterility tests are carried out to prove the absence of micro-organisms in the vaccine.

In only one animal was there found evidence of foot-and-mouth disease following the injection of a sample of vaccine. The animal in question had been transported from East Prussia to the Island of Reims and had evidently been injured in transit, for a large hæmatoma was found in the left hip and it may be argued that this so reduced the natural resistance of the animal as to cause it to be especially susceptible even to highly attenuated virus.

The results of the laboratory investigations are given under six headings. (1) Infectivity of the vaccine. The vaccine contains no virus capable of setting up infection in cattle. The subcutaneous injection and the tongue scarification tests prove this point. Further, injected cattle are not infective to susceptible, in-contact cattle. As already stated, only one injected animal became infected, and this beast had been injured before being treated. (2) Local and general reactions. The injection is made about 20 cm. above the sternum and within seven days a large local swelling appears. It rapidly subsides. A hard lump about the size of a hen's egg may persist. About one-third of the injected animals showed some degree of fever, but no general disturbance could be recognised by ordinary observation. (3) Immunity. There was evidence that some immunity was demonstrable five days after the injection of vaccine, but that it did not reach its maximum for fourteen days. There was no evidence of excretion of active virus by any injected animal. From the experiments it was concluded that 97 per cent. of injected cattle became actively immune after treatment as shown by failure to contract foot-and-mouth disease on exposure to infection. As far as duration of immunity is concerned, the observations have not been made over a sufficiently long period for definite estimations to be made, but it is shown that immunity lasts for at least six weeks (the longest period observed up to date). (4) and (5) Preparation of the vaccine in large amounts

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and of uniform power. The chief difficulty is the obtaining of a supply of virus, which can only be recovered from cattle showing small, early mouth lesions following artificial infection. It is estimated that soon 300 litres of virus per week will be available. A possible source of virus mentioned is from cultures *in vitro*. The authors are working on the problem now, but so far have not been successful. Aluminium hydroxide is cheap and there is no difficulty in obtaining supplies. The method of attenuation allows an exactly similar product to be obtained all the time. Only one injection is given and varies from 20 to 60 c.c., depending on the size of the animal (calf or adult). Further research is indicated to determine whether a second dose will produce a prolonged immunity. (6) Bacteriological examination of the vaccine and evidence of its suitability for injection. Three or four cattle are used for the necessary tests and each receives the maximum dose. Examination of the donors of virus is also made, especially examination of the mouth for evidence of catarrhal fever, etc.

The first paper is summarised as follows: It has been shown that cattle highly susceptible to foot-and-mouth disease can be actively immunised with complete safety. The researches have been carried out in the laboratory and in the cattle sheds. The results were communicated on February 10, 1938, to the Reich and Prussian Ministries of Agriculture, when it was decided to conduct field experiments to answer the following three questions:

(1) Is the material safe to use, i.e., will it produce no ill effects locally or generally?

(2) How long will it take for immunity to develop?

(3) How long will immunity last?

The use of vaccine in the field was commenced on March 2, 1938, under the direction of Dr. Strodthoff for the purpose of answering these questions.

* * *

The second paper describes the testing of the vaccine in the field, and involved the injection of over 40,000 animals. Cattle in three different areas were used: (a) districts in which foot-and-mouth disease was non-existent; (b) districts in which a single outbreak had occurred; (c) a district in which several outbreaks had been reported. Elaborate precautions were taken to ensure that no infection was brought into the farms on which injected cattle were being kept. The districts were very carefully chosen, the decision for their use being arrived at from a study of the spread of foot-and-mouth disease in the country. It was also of importance in deciding the farms for use to obviate any chance of immune cattle occurring in the various groups.

For example, in the non-infected districts the various farms on which animals were treated were kept under police supervision for a period of ten days following the injection, and the following regulations were imposed: (1) Cloven-footed animals were only allowed to be moved out of their stalls and sheds under urgent circumstances to be sent for slaughter, and

only after consultation with the veterinary surgeon. Such cattle may be taken by road to the abattoir. (2) No cloven-footed animal to be introduced to the farm during the stated time. (3) Milk from the cows may be sent to the milk factory only under certain agreements and restrictions concerning its disposal. (4) No unauthorised person may enter the farm premises. (5) People living or working on the farm may not enter the sheds containing the vaccinated animals.

A description is given of the method of vaccination. The vaccine is kept in cold store and for this purpose a cold room was taken over in the Market Hall of Breslau and the necessary amount of vaccine was taken out each morning. The injections were carried out in the following manner: (a) The premises must be free from foot-and-mouth disease. In infected premises vaccination is contra-indicated, for if superimposed on an infection the injected animal may become badly infected. Immunity is not produced in demonstrable quantity for five to eight days, and reaches its maximum fourteen days after the vaccine is used. (b) Cattle which have received an injection of foot-and-mouth disease serum (for protective purposes) are not treated. It has been shown that convalescent serum or highly immune serum prevents the establishing of an active immunity. (c) The injection site is 10 to 15 cm. above the point of the sternum. The vaccine must not be injected under the sternum, otherwise it may remain localised and give rise to trouble. No other site should be used. (d) Regulations are imposed concerning the handling of the vaccine and the disposal of used or broken containers. (e) The following doses are used:

Cattle	
Up to 6 months (to 2 cwts.)	20 c.c.
6 months to 2 years (to 6 cwts.)	40 c.c.
Over 2 years (over 6 cwts.)	60 c.c.
Sheep	
Very young lambs	5 c.c.
Older lambs	10 c.c.
Yearlings and older sheep	20 c.c.
Pigs	
Up to 4 weeks	5 c.c.
4 weeks up to 20 kilos	10 c.c.
Over 20 kilos	20 c.c.

It was noted that a local reaction occurred following injection (swelling 10 x 15 cm.), increasing in size for seven days and then subsiding. There was no fall in the milk yield and no interference with the general health of the animals. Newly calved cows did not show any untoward symptoms, nor did abortions take place. In three farms only in the first district was there an outbreak of foot-and-mouth disease, and in each case it occurred before full immunity could have been established (i.e., within fourteen days following in-

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jection). In the first outbreak 111 cattle were concerned. Seventy young beasts were moved about from box to box during the vaccination process, and two were not injected. One cow was omitted because she had only been calved two days. On the fourth day after vaccination a young animal showed evidence of foot-and mouth disease. In all, two vaccinated and the three unvaccinated animals became affected. The second outbreak occurred five to six days after vaccination had been carried out. Of 24 animals, eight cows and one young animal became affected. The milk yield fell, but rose again by the tenth day. In the third outbreak, which involved 25 cattle, there was the history of the introduction of an animal five days before vaccination was carried out. It is argued that the vaccine could not have caused these outbreaks because of the large number of animals injected without any ill effects.

Of these 9,582 animals all (with the above exceptions) remained free from foot-and-mouth disease except six, i.e., 0.06 per cent., which became infected some weeks later.

The second and third groups of experiments were carried out in districts in which foot-and-mouth disease was present, and involved the vaccination of 31,094 cattle on 2,784 farms. Some excellent tables explain the results, which may be summarised as follows: if vaccinated animals remained free from evidence of foot-and-mouth disease for fourteen days following the injection they were apparently actively immunised. The nearer to the injection of vaccine the infection took place, the greater was the tendency for the disease to develop in the vaccinated animals, but infection later than fourteen days following injection was not followed by symptoms of foot-and-mouth disease. There is apparently no danger of spreading foot-and-mouth disease from vaccinated animals which show no symptoms of the disease.

From the work carried out in the field, the following are the answers to the three questions under investigation:

(1) The injection material has been used on 40,676 cattle and has apparently been harmless. No epidemic occurred and no local or general reactions were observed.

(2) A true active immunity develops in vaccinated cattle against foot-and-mouth disease in the field in twelve to fourteen days following injection of the vaccine. After this period no vaccinated animals developed foot-and-mouth disease. There is some evidence that immunity begins to develop in five to six days following the injection of the vaccine, for when infection is brought on to premises containing vaccinated cattle even five to six days following the injections, only some of the cattle become infected.

(3) As far as the observations have gone the active immunity lasts for at least two to three months. (These are the longest periods that have elapsed since the experiments were begun, and hence no further information is yet available.)

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Reviews

PRELIMINARY NOTICE

Special Pathology and Therapeutics of the Diseases of Domestic Animals. Hutyra and Marek and Manninger, 4th Edition. Edited by Dr. Russell Greig with collaboration of Drs. Mohler and Eichhorn. Published by Baillière, Tindall and Cox. Pp. 2,410. 724 illustrations. In three volumes. Price £6 6s.

The 4th edition of this "magnum opus" of Veterinary Pathology and Therapeutics, equally valuable to the laboratory worker and to the clinician, has just arrived as we were going to press with the Special Congress Number, and it is much too important a book to be passed over lightly—although to review every section of it would not be giving it too much prominence.

That a book of this size and this cost has reached a fourth edition in a small profession such as ours is sufficient recommendation that the material within its covers must be good—and more conclusive still, it must be satisfying—and this is truthfully the case.

It must be a matter of great pride to the authors that not only has their book been translated into French and English, but that it is the accepted textbook and work of reference on Veterinary matters in every civilised country of the world. The present edition has been brought right up to date—in the German by the late Dr. Hutyra, by Dr. Marek, and by Dr. Rudolph Manninger, both of the Royal Hungarian University of Buda-Pesth—and for the benefit of our British readers by Dr. J. Russell Greig on this side of the Atlantic, and Drs. Mohler and Eichhorn in America.

A stronger combination could not have been selected, and the publishers have spared no expense to make the letterpress clear and the sketches and drawings illustrative. The type is good and the arrangement of the diseases, etc., is excellent, whilst each of the three volumes are so cleverly bound that the book falls open naturally and keeps open, even on one's knee, without any of the worries which a newly-bound book is apt to give rise to. The price may seem a lot to invest in one book, but whether a man is in busy practice or whether he is only doing one class of work in a laboratory, Hutyra and Marek is equally valuable—in fact, necessary; and must find a ready place on one's desk or handy bookshelf. One positively can't afford to be without it. To pick out one disease only for the purpose of review would be invidious. The whole book—every chapter—is invaluable, equally for the student at college or the graduate; whether in practice or in a Colonial or other such Public Health position. Its illustrations (many coloured), too, must not be omitted to be mentioned, as some of them display great talent; and they, too, add very materially to the practical value and recognition of the diseases described. They, in particular, are most useful to the student and the teacher, and it must be the aim of each to possess a copy; and even if it does mean a sacrifice in another direction, the result will be found to be well worth while.

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Personal

SIR ARTHUR OLVER.

Our readers will note with pleasure the addition of the name of COLONEL SIR ARTHUR OLVER, the newly-elected Principal of the Royal (Dick) Veterinary College, Edinburgh, to the Editorial staff of THE VETERINARY JOURNAL.

SIR ARTHUR OLVER'S work for the profession and for animal husbandry in India is too well known to need comment, and he brings back to Great Britain a wealth of experience in the solution of animal health problems which will be utilised most opportunely at the present time of agricultural uplift.

Congratulations to MAJOR GORDON F. STEVENSON on the award of O.B.E. (Military Division) for Valuable Services rendered during the military operations in Waziristan.

Items of Interest

We have received notification from General Electrical Construction and Maintenance, Ltd., of 35, Cannon Street, London, who are manufacturers of the well-known cat and dog electrocution apparatus, that in consequence of the reduced cost of production made possible by increased demand, they have been able to reduce the cost of this apparatus, and the reduced prices now are £45 for the dog cabinet and £35 for the cat cabinet.

This information we are sure will be of interest to all who undertake the humane destruction of animals.

We are also informed that since the publication of the N.V.M.A. Euthanasia Committee's Report last year the cat electrocution cabinet has been considerably improved, and its performance is now comparable with that of the dog cabinet.

Publishers' Notices

All communications should be addressed to 7 and 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Temple Bar 8568. Telegrams: "Baillière Phone, London."

Letters for the Journal, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

Copy of advertisements should be in the hands of the publishers—Baillière, Tindall and Cox—not later than the 25th of the month, or if proof is required, not later than the 23rd.

Binding Cases for Volume 93 and any other previous volumes can be obtained from the publishers. Price 2s. 9d. post free.

Annual Subscription, 21s. ($5.00 U.S.A. currency), post free.

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